Operations Manual

WM XL

By *RGF* Environmental Group, Inc.

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Overview

Introduction

About *RGF*

Congratulations on the purchase of your new *RGF* Ultrasorb® water treatment system. For over 25 years *RGF* Environmental Group Inc. has been the industry leader in industrial wash water treatment systems with thousands of installations worldwide.

Founded in 1985, *RGF* pioneered the development of heavy equipment zero discharge wash water recycling systems. Since then, *RGF* has continuously expanded to encompass the entire scope of water treatment concerns of industry. Today *RGF* offers a variety of products and services that is among the widest available in the pollution control equipment industry.

How to Use This Manual

As with any piece of new equipment, the first thing you should do is obtain a complete understanding of the operation and maintenance of the system before you begin. The best way to do this is to read the manual and associated documentation sent with the unit well before it is scheduled to be installed. *RGF* has invested a great deal of effort to make our manuals as informative and user friendly as possible to make the task of learning about your new system as enjoyable as possible.

How This Manual Is Organized

This manual is divided into the following major sections.

Shipment Inspection/ Receipt Checklist:

This section should be read immediately upon receipt of your system.

Safety:

A description of the labeling conventions employed in the manual to point out specific items relating to issues of personnel safety and proper operation of the system. General safety concerns and overall operational guidelines for the system.

Chapter 1: The Ultrasorb® System

Unit familiarization, basic system information and system flow diagrams. Covers the overall concepts of the Vision 2000 Ultrasorb® System.

Chapter 2: Installation

Provides important information to ensure proper equipment placement and connection.

Chapter 3: System Startup and Operation

Contains the steps required to properly start up your new system. The Operating Instructions outline the normal course of action for the routine operation of the system.

Chapter 4: Preventative Maintenance Schedule

Recommended periodicities for maintenance routines are located in this section. Personnel who will be maintaining the unit should familiarize themselves fully with this section.

Chapter 5: General Theory

A description of how the *RGF* Ultrasorb® system actually separates clarifies and treats the waste stream. In depth explanations of the processes and supporting information to help operators understand the physics and chemistry of the system.

Chapter 6: Controlling Water Quality

Without proper water chemistry control, even the most sophisticated systems will fail to perform to expectations. This section covers important topics which must be continually considered for proper system operation.

Chapter 7: Engineering Drawings

Reference drawings and schematics of the system.

Chapter 8: Troubleshooting

This section provides possible remedies for unusual operating conditions that occur from time to time.

Chapter 9: Replacement Parts List

A convenient source for locating part numbers and nomenclature of commonly replaced items on the system.

Chapter 10: Sub-Component Manuals

Additional literature provided on individual components of the system. This section is useful for more detailed knowledge of technical specifications regarding a specific sub-component.

Sources of Help

If you are unable to answer questions you have about your system from the information in this manual, *RGF* provides the following additional sources of help.

1) Your local ***RGF* Licensed Distributor.** He has a service support staff that is trained on all systems.

2) ***RGF* Web Site Help Page** provides answers to commonly asked questions and late breaking information concerning system operation and maintenance.

http://www.rgf.com

3) If you still have questions or have comments, the ***RGF* Service Department** can be contacted by **e-mail** at:

e-mail: requests@rgf.com

E-mail queries receive first priority through the Service Department. Please include as much information as possible so our service staff can quickly return an answer.

Shipment Inspection

Shipment Inspection

Immediately upon receipt of the **Ultrasorb® System**, you are responsible as the purchaser to take the shipping containers off the truck and inspect the equipment, storage tanks and parts for damage.

IF ANY VISIBLE DAMAGE TO THE EQUIPMENT IS EVIDENT:

- Notify the driver for the courier company **immediately** and write on the Bill of Lading what is damaged or missing.

- Call ***RGF*** immediately at (**800)-842-7771,** (**561)-848-1826 (FL),** or **FAX** (**561**)**-848-9454** a copy of the Bill of Lading with damage or missing items to ***RGF***.

Pre-Installation Checklist

Remove the ***RGF*** **PACKING SLIP** and the **BILL OF LADING.** Verify the condition and presence of all the parts and components found on the pallets and skids. Remove the **LOOSE PARTS CHECKLIST** from inside of the **LOOSE PARTS BOX** and verify the condition and presence of all the parts and components within the box. If any of the items are missing, please contact your distributor immediately or ***RGF*** at (**800)-842-7771,** (**561**)**-848-1826 (FL),** or **FAX** (**561)-848-9454.**

Safety

Labeling Conventions in This Manual

Certain information contained in this manual is **VERY IMPORTANT**. In addition, there are varying degrees of importance of this special information. Since most of the special information regards safety related issues, this section explains the conventions used throughout this manual. The following information explains the various conventions used to highlight important information

This statement directly regards an immediate **RISK TO LIFE**.

This designation, along with its associated graphical representation, denotes information that must be completely understood and heeded in order to prevent **Serious Personal Harm or Significant Environmental Consequences**.

This designation brings special attention to information that sensitizes the reader to the importance of following the instruction carefully. Typically used for information that reduces the risk of equipment damage or increases personal safety of the operator.

Note:

This designation clarifies or brings attention to particularly useful information that increases unit performance or reduces operating costs.

General Safety Issues

- All operating procedures, cautions, and warnings MUST be adhered to when operating the Ultrasorb® system and when using the recycled water processed through the system.

- All OSHA guidelines should be followed and material safety data sheets (MSDS) for all chemicals being used to treat the recycled water should be posted by the owner or operator of the system in a conspicuous place for all persons coming into contact with the system.

- Appropriate personal protective equipment MUST be used by all persons utilizing chemicals when maintaining and operating the system to avoid personal injury.

- Ensure all areas surrounding the system are adequately ventilated.

- Avoid adding excessive chemicals to the recycling system. (Refer to section 6.0, controlling water quality)

Note:

Additional safety precautions are listed throughout the manual.

Important Safety Instructions

PLEASE FOLLOW ALL INSTALLATION INSTRUCTIONS.

1. All plumbing connections should be made by a licensed, qualified Plumber.
2. All electrical connections should be made by a licensed, qualified Electrician.
3. Before attempting any electrical connections, be sure all power is off at the main circuit breaker.
4. The electrical supply for this product must include a suitably rated switch or circuit breaker to open all ungrounded supply conductors to comply with Section 422-20 of the National Electrical Code, ANSI/NFPA 70-1987.
5. The means of disconnecting the equipment must be readily accessible to the operator(s).
6. Ambient temperature around the equipment should be between 34° and 80° F (1.1° to 26.6° C). Installation in an environment where temperatures exceed 100° F for any continuous 24-hour operating period will void the warranty.
7. This equipment must be validated by the manufacturer for its Intended use.

Chapter 1: The Ultrasorb® System

The Vision 2000 Concept

The Vision 2000 line of Ultrasorb® systems was designed with modularity in mind, to suit each individual waste stream properly. ***RGF*** has available several standard models that may be integrated together as shown in Figure 1.1. However, depending on how your particular waste stream needs to be treated, your distributor or system integrator may have added additional components to the standard system. If additional components have been added, it is important to become familiar with the components' names and functions and where they will fit into the waste streams flow through the system.

➢ *Basic System Layout*

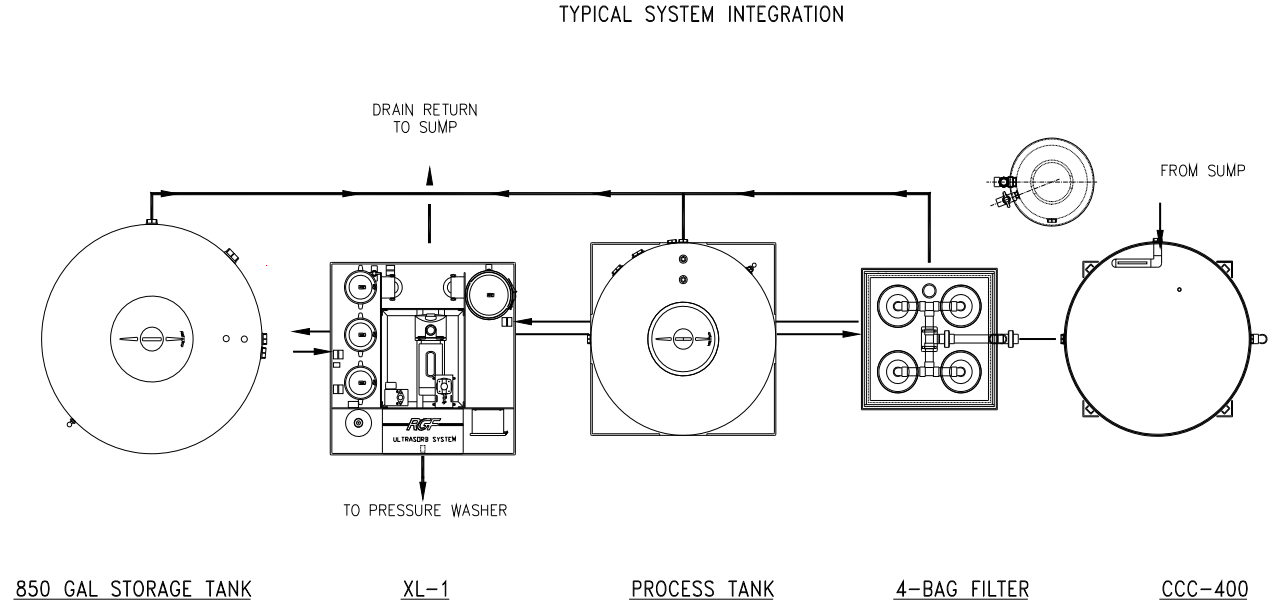
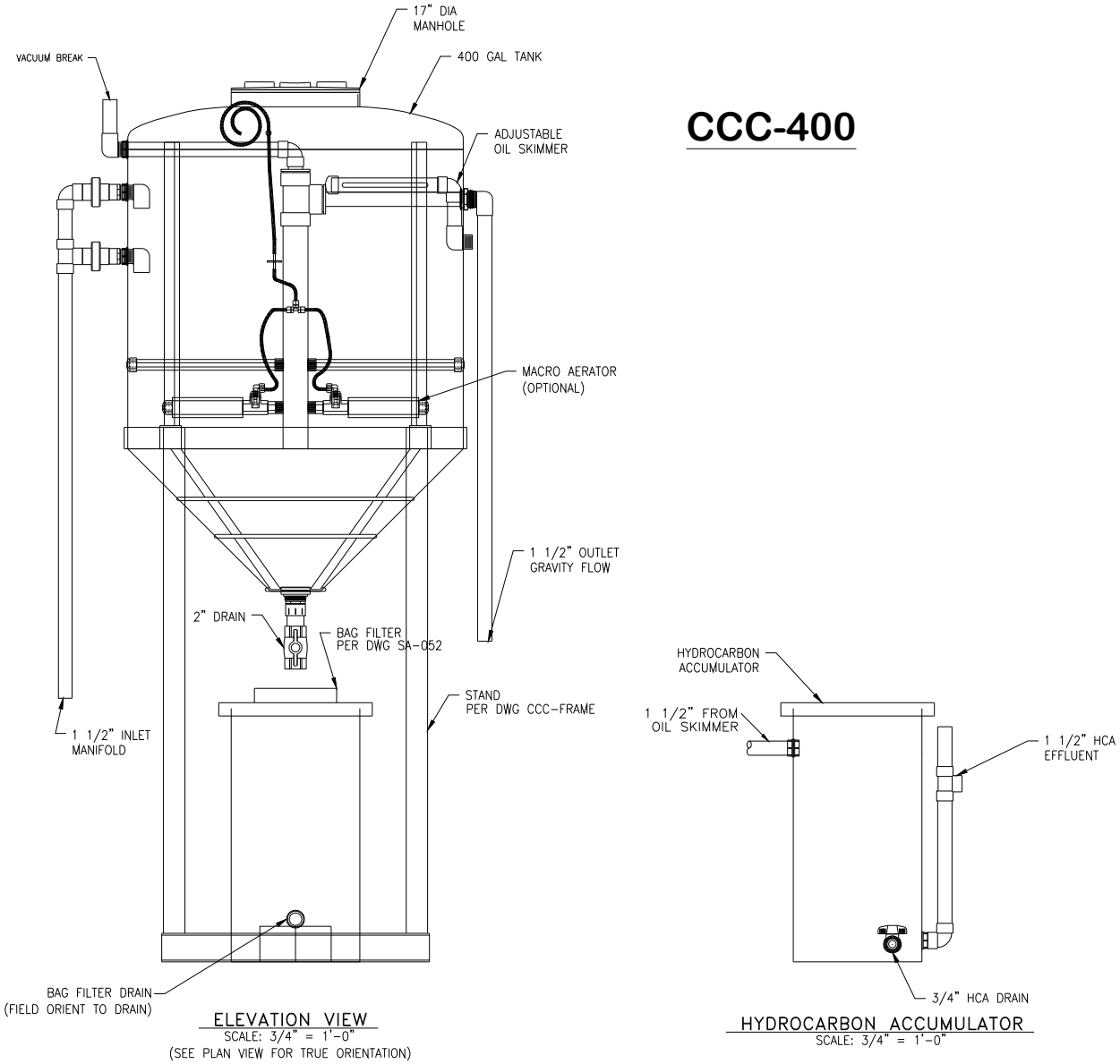


Figure 1.1

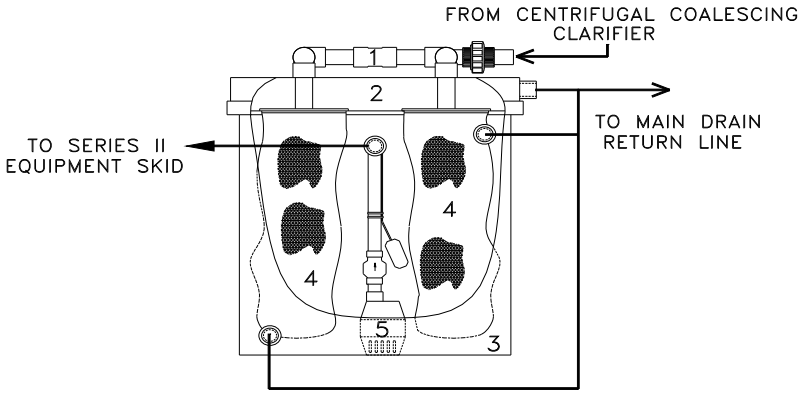
The Ultrasorb® System

This manual contains information on system installation, start-up, operation and maintenance as well as containing useful information on controlling water quality, training bulletins, and the theory behind how the Ultrasorb® System operates. In order to perform installation, start-up and maintenance procedures easily and correctly, it is important to become familiar with the system that you have. Chapter 1.0 is designed for just that purpose.

Unit Familiarization / Flow Diagram



GRAVITY BAG FILTER
FLOW DIAGRAM

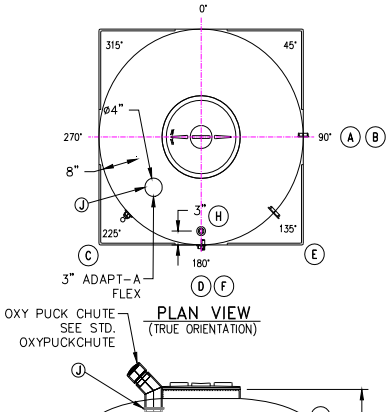


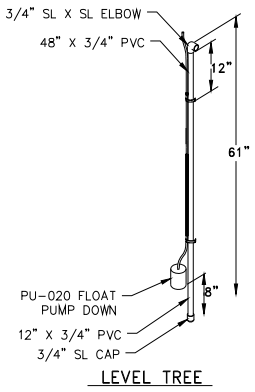
1 INLET PIPE ASSEMBLY
2 LID ASSEMBLY
3 BAG FILTER CONTAINER
4 COLLECTION BAGS
5 SUMP PUMP

LEGEND

- PROCESS FLOW
- CFC WATER FLOW
- FRESH WATER FLOW
- CLEANING SYSTEM FLOW
- DRAIN RETURN

550 GAL. PROCESS TANK

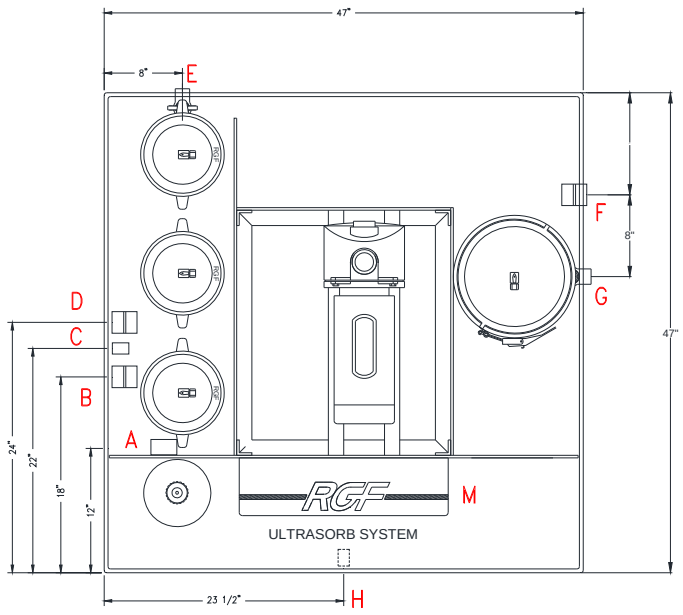




HOLES LIST

A	1 1/2" FPT TANK OVERFLOW – TO PIT
B	1 1/2" SLIP BALL VALVE TANK DRAIN TO PIT
C	3/4" SPIN FOR TANK SIGHT GAUGE
D	3/4' LEVEL TREE PIPE CONNECTION
E	1 1/2" FPT WATER INLET FROM PIT
F	1 1/2" FPT TANK OUTLET
H	3/4" SPIN – LOW LEVEL FLOAT SWITCH
J	OXY PUCK CHUTE

WM-XL SERIES II



FRONT

SYSTEM CONNECTIONS

A – CFC SYSTEM RETURN (TO STORAGE TANK)
3/4" SLIP UNION

B – CFC SYSTEM INLET (FROM STORAGE TANK)
1 1/2" FPT

C – FRESH WATER INLET
3/4" FPT

D – PRODUCT WATER OUTLET (TO STORAGE TANK)
1 1/2" FPT

E – POLISH FILTER DRAINS (TO MAIN DRAIN)
3/4" SLIP BALL VALVE (PD-1)

F – SYSTEM INLET (FROM UPSTREAM COMPONENT)
1 1/2" FPT (PF-4)

G – HYDROCARBON ACCUMULATOR DRAIN (TO MAIN DRAIN)
3/4" SLIP BALL VALVE (HCA-2)

H – SYSTEM SUPPLY HEADER
1 1/2" FPT

M – 220 VAC MAIN ELECTRICAL FEED (SIDE OF BOX)
30 AMP, 60 Hz, SINGLE PHASE W/NEUTRAL&GROUND

NOTE:
EQUIPMENT SKID IS DESIGNED FOR THE STORAGE TANK TO BE LOCATED TO THE LEFT OF THE SKID.

Chapter 2: Installation

Installation Requirements

The **ULTRASORB® System** must be installed in strict compliance with these procedures in order for the warranty to be activated. The purchaser is responsible for bringing the required utilities (i.e. water, electricity and drainage) to the system and connecting them according to local codes. If the system must be modified by ***RGF*** or the distributor in order to meet the requirements of local codes, the purchaser will be required to pay the modification costs. When the purchaser has completed all of the above, a field representative will be furnished by the ***RGF*** Distributor. He will provide installation check-out, testing and training at no charge.

Please read the installation procedure completely and thoroughly before installing and operating the unit.

Installation Procedure

It is important to fully understand Chapter 1.0 to help to become familiar with all of the components and equipment names of your particular system for installation, start up, operating and maintenance procedures

NOTE:

Make sure to use Teflon tape or Teflon paste on all threaded connections and PVC glue (medium blue PVC cement) on all slip connections.

Equipment Placement

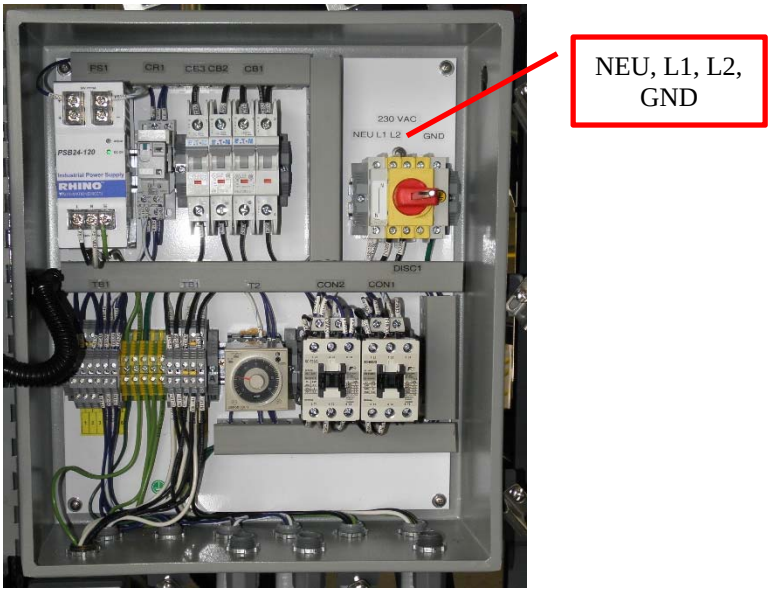
Place all of the equipment skids and tanks on the concrete pad location as desired. Allow a minimum of 2' clearance between components for access ways.

Main Drain Return Line

A. MAIN DRAIN RETURN LINE should be imbedded in the equipment pad prior to system installation. If there is not one available, one should be plumbed to accommodate drain return lines from the components of the system. This return line should be readily accessible from the rear of each component such that all of the drain lines from each component can be plumbed into a common manifold and fed into the Main Drain Return Line (refer to the "Suggested Layout.).

Main Electrical Connection

A. MAIN ELECTRICAL JUNCTION for the particular system components should be planned into the equipment pad prior to system installation. Refer to Chapter 7 for exact power requirements. Most installations will require 220 VAC, 30 amps, 1 phase, 60 Hz with a neutral and a ground as a minimum.



Coalescing Centrifugal Clarifier (CCC)

➢ *Inlet Connection*

A. Disconnect the two unions with MPT (male pipe thread) from the supplied **INLET MANIFOLD** and connect to the two inlet connections on the side of the cone tank. Reconnect the two unions to the inlet manifold.

B. Plumb from the sump to the **INLET CONNECTION** on the **INLET MANIFOLD**. This line requires the use of an isolation / throttle ball valve for flow control adjustment and check valve.

➢ *Outlet Connection*

A. Connect the supplied **OUTLET MANIFOLD** to the outlet connection (highest connection) on the side of the tank.

B. Plumb from the **OUTLET CONNECTION** to the next component.

➢ *Solids Bag Filter Tank / Drain Connection*

A. Place the **SOLIDS BAG FILTER TANK** directly under the cone of the tank. Attach the lid and bag filter to the tank.

B. Attach the supplied 2" **DRAIN BALL VALVE** with MPT to the 2" FPT fitting on the bottom of the cone tank. Connect the supplied pipe so it is directed down into the bag filter (either do not glue this connection or attach with a union so the bag filter can be removed for maintenance).

C. Plumb the Drain Connection of the Tank to the **MAIN DRAIN RETURN LINE**.

➢ *Hydrocarbon Accumulator*

A. Assemble the supplied **ACCUMULATOR STAND**. Place and level the Accumulator stand near the Oil Skimmer Outlet on the tank and place the **HYDROCARBON ACCUMULATOR TANK** on the stand. Assemble the internals, inlets, and outlets of the Accumulator Tank.

B. Attach the supplied **OIL SKIMMER MANIFOLD** to the Oil Skimmer Connection on the side of the tank. Plumb the Oil Skimmer Manifold into the Inlet on the Hydrocarbon Accumulator.

C. Plumb the **ACCUMULATOR RETURN LINE** to the **MAIN DRAIN RETURN LINE**.

➢ *Ozone Macro Aerators*

A. Uncoil the 3/8" poly air line for the Macro Aerators and lead to the TurboHydrozone® Outlet (optional).

Gravity Bag Filter

➢ *Tank Assembly*

A. Place the **TANK LID** on the top of the tank with the overflow containment side up. Place the **FILTER BAGS** in the cradles of the lid.

➢ *Inlet Connection*

A. Place the supplied **DISTRIBUTION HEADER** on the Lid and plumb to the Upstream Component Outlet. A PVC union must be installed in this line in order for the lid to be removed for maintenance.

➢ *Outlet Connection*

A. Plumb the **OUTLET** from the Tank Outlet to the Downstream Component Inlet.

➢ *Tank Overflow / Drain Connection*

A. Plumb the **TANK OVERFLOW** to the **MAIN DRAIN RETURN LINE**.

B. Plumb the **LID OVERFLOW** to the **MAIN DRAIN RETURN LINE**.

C. Attach the 1 $^{1}/_{2}$" **BALL VALVE** to the 1 $^{1}/_{2}$" FPT **DRAIN CONNECTION**. Plumb the **TANK DRAIN** to the **MAIN DRAIN RETURN LINE**.

Series II Equipment Skid

➢ *HCA-3 Absorber Connections*

A. Plumb the **OUTLET** from the Gravity Bag Filter to the inlet on the **HCA-3 HYDROCARBON ABSORBER**. This line should include the supplied Y-Strainer.

B. The Y-Strainer should be connected as indicated below or can be located between the Gravity Bag Filter and Series II as desired.

- Attach the supplied 6” x 1 1/2” threaded nipple into the female adapter on the inlet of the Series II.
- Attach the Y-Strainer onto the nipple with the indicator arrow facing towards the Series II. The ideal position for the Y-Strainer is in the straight down position or at a 45° from the ground.
- Connect the supplied male adapter into the remaining end of the Y-strainer, then continue plumbing to the Gravity Bag Filter.

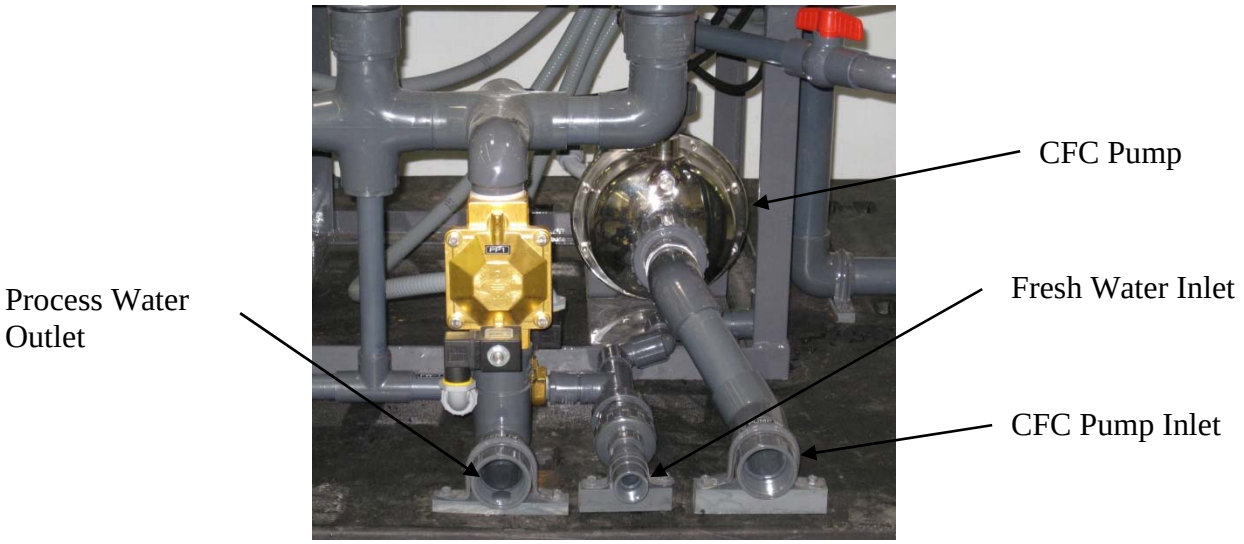
B. Plumb the **OUTLET** from the HCA-3 Hydrocarbon Absorber to the **INLET** of the Process Tank.

➢ *CFC System Inlet / Outlet Connection*

A. Plumb from the **CFC SYSTEM INLET** to the **SERIES III STORAGE TANK OUTLET**. This line requires the use of an isolation ball valve.

B. Plumb from the **CFC SYSTEM RETURN** from the 3/4" fitting on top of the UV/O^3 Catalytic Chamber to the **SERIES III STORAGE TANK CFC SYSTEM RETURN INLET**.

C. Plumb the **CFC BLEED BACK** from the 1/4" fitting on top of the UV/O^3 Catalytic Chamber using part of the supplied 1/4" poly hose and lead into the **BLEED BACK INLET** on the Hydrocarbon Accumulator.



➢ *Fresh Water Inlet Connection*

A. Plumb a **FRESH WATER SOURCE** to the Equipment Skid 3/4" FPT **FRESH WATER INLET**. This line requires the use of an isolation ball valve and backflow preventer.

➢ *Drain Return / Bleed Line Connections*

A. Plumb any 3/4" **POLISHING FILTER DRAINS** to the **MAIN DRAIN RETURN LINE**.

B. Plumb any 1 1/2" **POLISHING FILTER DRAINS** to the **MAIN DRAIN RETURN LINE**.

C. Plumb any 3/4" **HCA-3 HYDROCARBON ABSORBER DRAIN** to the **MAIN DRAIN RETURN LINE**.

D. Plumb the 3/4" **CLEANING TANK DRAIN** to the **MAIN DRAIN RETURN LINE**.

E. Plumb the Polishing Filters **SOLIDS BLEED VALVES** (bottom hose valves on housings) using part of the supplied 3/8" poly hose and lead back to the **MAIN DRAIN RETURN.**

NOTE:

The top hose valves are only needed for bleeding air from canister during startup.

➢ *Electrical Connections*

A. The 220 volt Electrical Connections to the **SERIES II ELECTRICAL JUNCTION BOX** should be connected by a certified electrician, according to local and national codes (refer to Chapter 7, Electrical Diagram.

IMPORTANT:

Do not turn on the power to the unit until all connections are made and the system is prepared for startup. Damage to the system pumps will result otherwise.

Electrical Panel Connections

Control Panel Layout

Series III Storage Tank

➢ *Overflow / Drain Connection*

A. Plumb from the **STORAGE TANK OVERFLOW** to the nearest overflow / storm water containment, sanitary sewer or secondary storage tank according to local and national code or plumb to the Main Drain Return Line.

NOTE:

Check with local authorities as to local codes for overflow water.

B. Plumb from the **STORAGE TANK DRAIN**, to the **MAIN DRAIN RETURN LINE**. This line requires the use of an isolation ball valve.

➢ *Fresh Water Inlet Connection*

A. Plumb a **FRESH WATER SOURCE** to the 3/4" slip **FRESH WATER MAKE UP INLET**. This line requires the use of an isolation ball valve and backflow preventer.

➢ *Float Switch Connections*

A. Attach all of the **STORAGE TANK FLOAT SWITCHES** according to Chapter 7 Electrical Diagram. These connections should be connected by a certified electrician according to local codes.

Process Tank

➢ *Overflow / Drain Connection*

A. Plumb from the **PROCESS TANK OVERFLOW and DRAIN** to the Main Drain Return Line. This line requires the use of an isolation ball valve.

➢ *Float Switch Connections*

A. Attach the **PROCESS TANK LOW LEVEL FLOAT SWITCH** according to Chapter 7 Electrical Diagram. This connection should be connected by a certified electrician according to local codes.

Chapter 3: System Startup and Operation

System Startup

➢ ***Before You begin***

The following startup procedures must be followed thoroughly in order to prevent damage to the system components. Remember:

Do not apply power to the system until directed to do so in the specific startup procedure!

Coalescing Centrifugal Clarifier (CCC)

A. Close all **DRAIN VALVES** (i.e. Cone Tank Drain, Hydrocarbon Accumulator Drain) and open all **ISOLATION VALVES** (i.e. Inlet Isolation Valve, Outlet Isolation Valve).

B. Fill the CCC tank with water until it starts to flow out the outlet to the next component of the system.

C. Adjust the height of the **OIL SKIMMER** such that the skimmer is just barely skimming the surface of the water.

D. Use the Inlet Isolation Valve to throttle the rate of flow into the CCC Tank after startup.

Gravity Bag Filter

A. Close all **DRAIN VALVES** (i.e. Bag Filter Drain Valve) and open all **ISOLATION VALVES** (i.e. Outlet Isolation Valve).

B. Fill the Bag Filter Tank approximately 3/4 full with water.

C. Check the **FLOAT SWITCH** on the tank to ensure it is free to swing. Adjust the tether length of the float switch to obtain the proper pumping range (approx. 12").

Series II Equipment Skid

➢ *Filling the System*

A. Close all **DRAIN VALVES** (e.g., valves PD-1, PD-2, PF-4, CD-1).

B. Ensure all filters are installed and the lids are hand tightened.

C. Recheck all unions to ensure they are not missing o-rings and are all hand tightened.

D. Open all of the purge valves on top of the filter housings and Hydrocarbon Absorber (PF-1, PF-2, PF-3, HCA-3).

E. Open the fresh water valves for the system (e.g., FW-1, FW-2 and FW-3). Allow the system to fill until water starts streaming from the purge valves, and then return the fresh water valves to close and then close all of the purge valves (PF-1, PF-2, PF-3, PF-4).

F. Open all of the **ISOLATION VALVES** between the components of the system.

G. Prime the Process Pump by removing the square priming plug from the Process Pump housing until water starts streaming from the priming hole, then replace the plug.

H Prime the CFC System Pump by removing the gauge fitting on the top of the CFC Pump piping assembly. Water should start emitting from the gauge fitting. Continue until a steady stream emits, then replace the gauge fitting.

NOTE:

Proper priming of this pump is of extreme importance. Failure to ensure proper priming will inhibit proper operation of the pump and destroy it.

➢ *HCA-3 ABSORBER SYSTEM*

A. Prepare the HCA-3 Absorber System for normal operation adjusting the Oil Bleed Valve (HCA-3 valve) to the 1/4 open position.

➢ *CFC / CO^3P System*

A. Prepare the CFC System for normal operating by opening CFC-1. The Ozone Venturi is factory preset.

➢ *Peristaltic Chemical Injection Pump*

A. Ensure the chemical pump suction line has been placed into a full Hydrogen Peroxide chemical container. Adjust the **CHEMICAL METERING KNOB** for the maximum setting. After start-up, reduce the pump setting to achieve the proper hydrogen peroxide levels.

Series III Storage Tank

A. Close the Storage Tank **DRAIN VALVE** and **ISOLATION VALVES**.

NOTE:

Do Not Open the Isolation Valves until directed to do so.

B. Turn on the Fresh Water Supply to the Storage Tank. Fill the Storage Tank approximately 3/4 full (400 gallon mark) with fresh water with a garden hose.

C. Ensure all of the **FLOAT SWITCHES** inside of the Storage Tank are free to swing.

Start-Up

A. Open all of the isolation ball valves between the components of the system

B. **POWER CAN NOW BE APPLIED TO THE SYSTEM COMPONENTS**. Immediately upon applying power to the system, the **AUX. SYSTEM** light should illuminate indicating that power has been applied to the CFC System. This is evident by the UV/O^3 Catalytic Chamber indicator (blue light on the side of the chamber) being illuminated, the 1/2 hp CFC Pump running continuously, and the Chemical Injector Pump will pump periodically. Ensure the CFC pump is properly primed which is indicated by a Supply Pump Gauge reading of approximately 11 psi.

System Operation

Coalescing Centrifugal Clarifier (CCC)

➢ *Operation*

The waste stream enters the cone tank through the inlet manifold from the sump or upstream component and circulates around the tank. Solids settle to the bottom of the cone tank and are flushed during routine maintenance into the Bag Filter. Oils float to the top of the tank and are skimmed off by the Oil Skimmer and deposited in the Hydrocarbon Accumulator. The water exits the tank by gravity flow through the Solids Separator into the Gravity Bag Filter. The water level in the tank will remain the same always

Controlling Flow

The flow through the CCC tank is controlled by the isolation valve on the inlet. This valve should be throttled if water is entering the tank too quickly and causing an overflow condition.

Gravity Bag Filter

➢ *Operation*

Water enters the Gravity bag filters from an upstream component and passes through the bag filters leaving behind large solids. Water accumulates in the filter tank until the float switch in the tank is activated. The accumulated solids in the filter bags are removed during routine maintenance, and any accumulated fine solids, in the bottom of the tank is also removed during routine maintenance.

Controlling Flow

The flow through the tank is controlled by two factors. The rate of flow into the tank is determined by the flow from the CCC and the rate of flow out of the tank is controlled by the sump pump. To adjust flow out of the tank, throttle the sump pump flow rate as desired.

Series II Equipment Skid

➢ *HCA-3 Absorber System*

Water is fed through the HCA-3 Absorber System from the Gravity Bag Filter. The discharge from this system is sent to the Process Tank. The Absorber system contains an Oil Bleed System (HCA-3 valve) which bleeds oils from the top of the absorber to the Hydrocarbon Accumulator.

➢ *Process System*

Water enters the Process System from the upstream component by the suction of the Process Pump and is passed through the Polishing Filters before it is transferred to the Series III Storage Tank. Fresh water back flushing is performed automatically by using valves FW-1, PD-2 and PP-1

➢ *CFC System (Continuous Flow Control)*

Water is continuously fed through the CFC system from the Storage Tank by the suction of the CFC System Pump and is supplied either to the CO^3P Process or to the supply header (SH-1). The water from the CFC Pump will flow through the CO^3P Process, until there is a demand at the supply header, at which time a majority of the flow will be supplied to the supply header (SH-1). The flow through the CO^3P Process passes recycled water through the Ozone and Chemical Venturi and the O3/UV Catalytic Chamber, and is returned to the Storage Tank. Flow rate through the CO^3P system is controlled by valve CFC-1.

NOTE:

In order for the catalytic oxidation process (CO^3P) to operate correctly, it is necessary to keep the hydrogen peroxide level in the Storage Tank above 10 ppm. For the first several weeks of operation of the system, monitor the level very closely. If the residual hydrogen peroxide level falls below the 10 ppm range, it will be necessary to increase the injection rate accordingly. The chemical output of the pump ranges from .96 GPD at the minimum setting to 16.2 GPD at the maximum setting.

Controlling Flow

Valve CFC-1 should be fully opened for normal operating conditions, however if insufficient flow is delivered to the supply header, CFC-1 may be throttled, but should NEVER be shut completely off.

IMPORTANT:

Valve CFC-1 must never be shut completely off. The UV/O^3 Catalyzation Chamber requires continuous flow or the bulb will overheat and malfunction.

➢ *WATER SUPPLY*

The Three Way Control Valve supply header switch (SH-1) on the Control Panel controls the water supply to the washing equipment. This header allows the option of using either Recycled (wash) water or Fresh (rinse) water by turning the switch either to the "Wash" (recycled water) or "Rinse" (fresh water) position. When no water supply is desired, the switch should be turned to the "OFF" position. NOTE: The switch will spring return back to the "Wash" position from the "Rinse" position.

Series III Storage Tank

➢ *Operation*

Water enters the Tank from fresh water make-up and the processed water from the Series II Skid. The water inside the tank is continuously pumped by the CFC System, through the CO^3P Process, and returned. When wash water supply is needed, wash water flow is pumped by the CFC System to the Supply Outlet Header. Float switches inside of the tank control the operation of the system.

Systems that have a Process System will have a high level (pump up) float switch. Systems that have a Back Up Polishing Filter will have a low level (pump up) float switch that will activate the Back Up Polishing Filter solenoid valve (SB-7). In addition, if the tank water level reaches a level below SB-7 valve, the fresh water make-up valve will allow fresh water to enter the tank.

Process Tank

➢ *Operation*

Water enters the Tank from HCA-3 Hydrocarbon Absorber. The Process Tank supplies water to the De-Mucking System and the Series II Equipment Skid. The water inside the tank is continuously treated with ozone from the UV/O3 Catalytic Chamber of the CFC System.

The Process System of the Series II Equipment Skid draws process water from the Process Tank, processes it through the system and sends it to the Series III Storage Tank. The Process Tank contains a low level switch that shuts off the Process System when the tank level is low and a high level float switch that shuts off the sump pump when the Process Tank is full.

Operational Notes

WARNING

• UV/O³ CATALYTIC CHAMBER

1) DO NOT look at the UV light in the chamber. PERMANENT DAMAGE OR BURNS TO EYES OR SKIN MAY RESULT.
2) DO NOT run the UV Chamber without water flow through the chamber; The UV bulb needs water flow to keep it cool. DAMAGE TO THE BULB WILL RESULT.
2) DO NOT open or attempt to repair the chamber. If problems occur, call your serviceman or distributor for further instruction.
3) DO NOT BREATHE OR INHALE THE OZONE GAS. PROLONGED BREATHING OF NOTICEABLE AMOUNTS OF OZONE may result in: respiratory irritation to nasal passages, throat, bronchial and pulmonary membranes; headache, nausea, burning, watery irritated eyes. In some instances (such as enclosed spaces and tanks), significant concentrations of ozone may collect. Adequately vent all tanks and enclosed spaces before entering for maintenance or repair until the level of ozone has depleted down to acceptable levels (<0.1 ppm). If an ozone odor is still noticeable, continue ventilating until the odor is non-detectable. Ozone odor is similar to the smell near copy machines when making copies or Mig and Tig welders in operation and is the "fresh air" odor one sometimes notices after a thunderstorm.

GENERAL NOTE:

At a level of 1 ppm, ozone becomes intolerable to humans. A humans reaction to this level is the same as the reaction to a strong bleach or ammonia odor. Usually, the nose will indicate discomfort.

CAUTION

• HYDROCARBON ABSORBER (HCA-3)

1) Do not operate the system when the absorber is saturated with oil, grease, or fuel. OTHERWISE, OIL WILL ENTER THE PROCESS SYSTEM.
2) *RGF* Cartridges have been lab tested and time tested - COPY CARTRIDGES HAVE BEEN KNOWN TO BREAK UP OR DISSOLVE, THEREBY PLUGGING OTHER PARTS OF THE UNIT CAUSING EXCESSIVE PRESSURE AND EQUIPMENT DAMAGE!!!

- ***POLISHING FILTER***

1) Before servicing be sure to RELIEVE THE PRESSURE on the Polishing Filter(s) by using the drain valve and bleed valve or PERSONAL INJURY COULD RESULT!
2) *RGF* Filters have been lab tested and time tested - COPY FILTERS HAVE BEEN KNOWN TO BREAK UP OR DISSOLVE, THEREBY PLUGGING OTHER PARTS OF THE UNIT CAUSING EXCESSIVE PRESSURE AND EQUIPMENT DAMAGE!!!

- ***CFC SYSTEM PUMP:***

1) Proper priming of the CFC System Pump is essential to the operation of the pump. Improper priming of the pump will cause poor performance and eventual pump failure.
2) DO NOT OPERATE the CFC System Pump if the Storage Tank is emptied or DAMAGE TO THE PUMP WILL RESULT.

- ***PROCESS PUMP:***

1) TO PREVENT DAMAGE TO THE PROCESS PUMP, DO NOT OPERATE without sufficient prime and net positive suction head (NPSH).
2) DO NOT OPERATE THE PUMP while the system valves are closed.

Chapter 4: Preventative Maintenance Schedule

Overview

The following section is developed to keep the **ULTRASORB® System** in top working order. It is **NECESSARY** to follow the maintenance procedures below precisely as stated. The lack of maintenance, in the long run, will reduce productivity and can be both costly and time consuming. It is recommended that this format be copied and incorporated as a regular work routine.

Turn off all power, and release pressure before servicing the system. <u>All gauges must read zero</u>!

Required Tools and Supplies

- ✓ Hammer
- ✓ Adjustable End Wrench
- ✓ 5 H.P. Shop VAC For Extracting Old Media
- ✓ Garden Hose For Back Flushing
- ✓ Tube Brush For UV/O^3 Chamber Cleaning
- ✓ pH Test Strips
- ✓ Garden Hose Nozzle
- ✓ #1 Flat Head Screw Driver For Venturi Adjustment If Needed
- ✓ Garbage Bag For Proper Filter Disposal
- ✓ Rubber Boots And Gloves
- ✓ Proper Safety Equipment
- ✓ Square Head Shovel For Digging Out Trench Valley

Daily Maintenance

Coalescing Centrifugal Clarifier (CCC)

➢ *Daily Maintenance*

A. Open the Drain Valve CCC-2 on the bottom of the Poly Cone Tank and let run for several minutes to flush out sediments.

B. Remove the bag filter from the bag filter tank and properly dispose of the collected debris and sediments from inside the bag. Replace the bag.

C. If there is a large amount of oil in the accumulator, then it will need to be drained off and disposed of properly. Drain the excess water out of the bottom of the Hydrocarbon Accumulator using the tank drain Valve. Drain the oil off by connecting a hose to the tank drain and connecting the other end to a 5 gallon can or drum and opening the Drain Valve.

D. Ensure the Macro Aerators inside the tank are functioning properly.

Gravity Bag Filter

➢ *Daily Maintenance*

A. Remove the Filter Bags and properly dispose of the collected debris and sediment. Replace the filter bags if they look weak or are torn.

B. Open the Drain Valve on the bottom of the tank and let run for several seconds to flush out sediments.

C. Lift up the Float Switch to see that it is functioning properly and the Sump Pump is pumping.

Series II Equipment Skid

➢ *Daily System Check*

Daily, with the system running, log the pressure gauge readings. Check the status of the indicator lights, hour meter, and chemical injection pump. Check the water level in the Storage Tank. Keep an accurate record of all of the readings and indicators to determine when certain components of the equipment skid will need maintenance.

Use the following as a general rule:

Polish Filter Gauges

If the pressure difference for the Polishing Filters is 10 psi or more, the filters need to be back flushed or manually cleaned.

CFC Pump Discharge Gauge

This gauge indicates the pressure in the CFC System. The system should operate at approximately 11 psi when there is no recycled water usage and 4-10 psi when there is recycled water usage.

Polishing Filters

➢ *Daily Maintenance*

A. Check the Inlet and Outlet Pressure Gauges for the Polishing Filters.

NOTE:

The Polishing Filters are back flushed by the auto back flush timer which is factory preset. If it is found that the automatic backwash sequence is insufficient as indicated by the inlet and outlet pressure difference on the Polishing Filters being greater than 10 psi, then the automatic backwash sequence will need to be changed accordingly.

UV/O^3 Catalytic Chambers

➢ *Daily Maintenance*

A. Ensure the UV/O^3 Catalytic Chamber indicator light on the side of the chambers (at the top) is illuminated. Ensure the air bleed valve at the base of the chamber is cracked open slightly to allow condensation to be bled off.

Weekly Maintenance

Trenches, Sumps, Pits, and Clarifiers

➢ *Weekly Maintenance*

Weekly, or as required, the trenches, sumps, pits and clarifiers of the pad need to be checked for sediment level. The trenches' sediment level should not be more than half of the depth of the trench. Dig out the trench using a shovel, and dispose of the waste accordingly. The sumps and pits should be dug out if there is at least 1/4 of the depth full of sediment. The clarifiers should be removed and dug out on a weekly basis, or as required, regardless of the amount of sediment.

IMPORTANT:

Dig out the trenches, sumps, pits and clarifiers as regularly as possible. Keeping them cleared of sediment build up will result in better water quality throughout the entire system.

Y-Strainer

➢ *Weekly Maintenance*

A. Turn the Process Control Switch to **OFF.**

B. Close the isolation valve to the Series I and (PF-4) on the Series II.

C. Unscrew the bottom of the Y-strainer and completely clean screen basket.

D. Reassemble the Y-strainer bottom with o-ring in place.

E. Open the isolation valve to the Series I and (PF-4) and reapply power.

F. Check for leaks.

Polishing Filters

➢ *Weekly Maintenance*

Weekly the Polishing Filters need to be removed and manually cleaned by the following procedure:

Manually Cleaning the Polishing Filters

A. Turn the Process Control Switch to **OFF.**

B. **OPEN** the Polishing Filters drain valve (PD-1) and solids bleed valves.

C. Allow to drain and relieve pressure. **The Pressure Gauges Should Read "Zero"**.

D. Disconnect all of the air bleed lines from the lids.

E. Remove the Polishing Filter Lids by turning them counterclockwise.

F. Remove and manually clean the Polishing Filters using a fresh water hose to flush all debris from the filter and the inside of the filter housings. Replace filters to the housings.

G. Replace the lids by turning clockwise; ensure the filter seals are in place on the housings.

H. Replace all of the air bleed lines to the lids.

I **SHUT** the Polishing Filter drain (PD-1) and solids bleed valves.

J Turn the Process Control Switch to **ON.**

Storage and Process Tanks

➢ *Weekly Maintenance*

A. Open the drain valve to the Storage Tank and allow draining for 1 minute to remove any accumulated solids from the bottom of the tank.

B. Check inside the tank to ensure the float switches are free to swing. Remove any accumulated debris or scum from the surface of the tank water.

Monthly Maintenance

HCA-3 Hydrocarbon Absorber

➢ *Monthly Maintenance*

Once a month, or as required, the HCA-3 Hydrocarbon Absorber needs to be checked for oil and solids loading. Replace if necessary.

A. Turn the Process Control Switch to **"OFF".**

B. Open the pressure relief valve on top of the HCA-3 housing. Close the isolation valve and open the drain valve on the HCA-3 and drain the housing.

C. Loosen and remove the lid clamp then remove the lid.

D. Remove the HCA-3 Filter from the housing by pulling straight up on the filter handle.

E. Flush the filter with water to remove accumulated debris. Check the filter for signs of oil saturation; if it looks slightly black and a oil sheen is present on the water used to flush the filter, then the filter is spent and should be replaced.

F. Return the filter to the housing and return it to normal operation.

G. Turn the Process Control Switch to "**ON".**

UV/O^3 Catalytic Chambers

➢ *Monthly Maintenance*

Once a month, or as required, the UV/O^3 Catalytic Chamber needs to be cleaned by the following procedure:

Shut off all power to the system before attempting to service or repair the UV/O^3 Catalytic Chamber. The chamber operates under high voltage, which can cause severe shock if ends are removed while power is applied.

A. Turn the main power to the system **OFF**.

B. Close the Isolation Ball Valves (CFC-1) to the CFC System.

C. Disconnect the union at the top of the **UV/O^3** chamber. It may be necessary to disconnect the bottom union to thoroughly clean the lower portion of the tube.

NOTE: Use caution in handling the UV/O^3 Catalytic Chamber. The UV bulb is extremely fragile and will break if the chamber is mishandled.

D. Insert an appropriate sized bottle brush and scrub the interior of the quartz glass tube. If a heavy build up of scale is present, prepare a solution of Citric Acid and scrub the tube until clean.

E. Reconnect the inlet and outlet and open isolation ball valve (CFC-1).

F. Turn the main power to the system back **ON**.

As Required Maintenance

Programmable Auto Back Flush

Change the Programmable automatic backwash sequence if the filters need to be back flushed more frequently. The Automatic Backwash Timer is factory pre-set to 24 hours between back flushes (T OFF dial) and two minutes of back flush (T On dial).

A. Turn the main power to the system **OFF**.

B. Open the Electrical Junction Box and remove the ODR relay

C. The dials on the face of the relay control the amount of time between back flushes (T OFF dial: green line) and the amount of time the back flush is performed (T ON dial: red line).

To change the amount of time between back flushes, turn the **T OFF** dial to the desired amount of time (scale is in hours). To change the amount of time the back flush is performed, turn the **T ON** dial to the desired amount of time (scale is in minutes).

If more than 10 minutes of back wash is preferred, it will be necessary to change the time scales of the relay. On the face of the relay are the Repeat Cycle switch settings which control the scale of the time OFF and time ON functions of the relay. They are factory set so the relay time OFF dial is in hours and the time ON dial is in minutes. To change them, refer to Chapter 10; Auto Back Flush Timer.

NOTE: If the power to the system is turned OFF, the timer restarts it's cycle from zero. The timer relay does not retain it's time cycle during power OFF.

Winterizing the System

In areas of the country where the system will be shut down for the winter or there is a possibility of local freezing, the system will need to be drained down to prevent damage to the internal components and piping of the system. The water from the system should be hauled off or evaporated. All main sumps to the system should be turned off, pumps removed and covered to prevent damage to the sump basins. All power to the system should be shut off completely. The components of the system should be drained completely (e.g. pumps, filter housings, UV/O^3 Chamber)

Chapter 5: General Theory

Overview

The Piping and Instrumentation Diagram in the Engineering Diagram Section outlines the path that the waste stream follows as it is recycled. The General Theory section explains each process of the recycling process. A comprehensive understanding of theory of the **ULTRASORB® System** should be achieved to assist in the proper installation, operation and maintenance of the system.

Centrifugal Coalescing Clarifier (CCC)

A 400 or 600 gallon Polyethylene Cone Tank (Figure CCC-1), imparts a centrifugal force on the waste stream. The waste stream enters the large upright vessel in the inlet manifold which directs the fluid in a circular flow. Heavier solids separate out of the waste stream and collect at the bottom of the vessel to be drained through a bag filter periodically for disposal. Free oils will rise to the surface to be skimmed off by the Oil Skimmer and directed to the Hydrocarbon Accumulator. In addition the Clarifier is equipped with macro aerators for Ozone injection. Ozone injection will reduce oxygen demand in the waste stream which should minimize if not eliminate odor problems. Optional flocculent injection or other water treatment chemicals may be added prior to the CCC to aid in separation and floatation.

Centrifugal Coalescing Clarifier

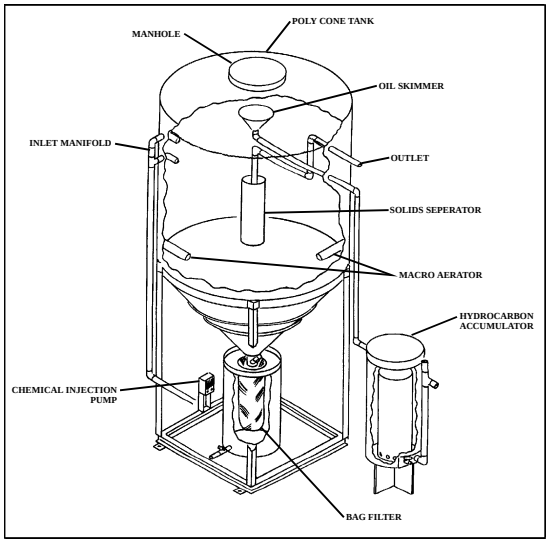


Figure CCC-1

Gravity Bag Filter

A 3 foot square tank with 4 filter bags utilizes conventional mechanical filtration to remove the solids loading in the waste stream. In the gravity flow version, the waste stream flows into the inlet distribution header into the filter bags removing solids which are trapped by the bag filters. In the Gravity version, a separate pump provides the additional driving force to force water through the modified supply header and filter bag assembly. The micron size of the bag filters can be selected to optimize water quality with an acceptable maintenance routine (Figure GRV.1).

Gravity Bag Filter

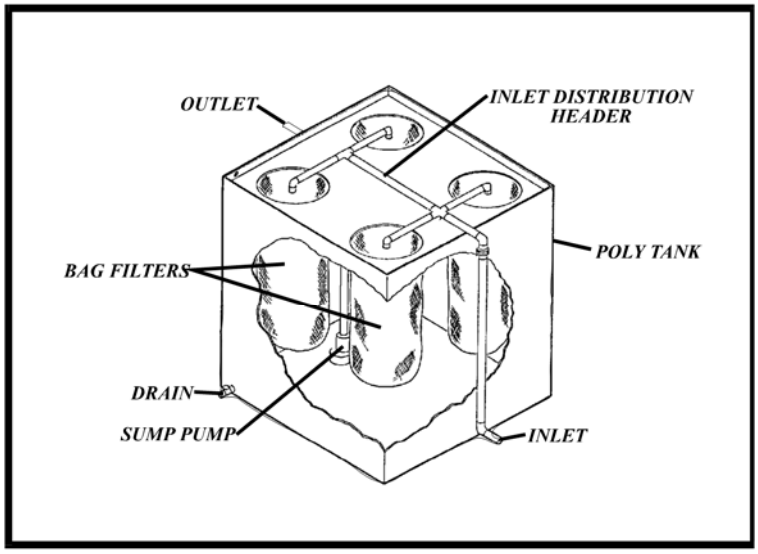


Figure GRV.1

Series II Equipment Skid

Process System

The process water enters the Process System of the Series II equipment Skid by the suction of the Process Pump. The water is filtered through the two primary Polishing Filters of the system down to the 10 micron range before passing it on to the MS^3 Membrane System. The third filter is the Back-Up Supply Filter which is only activated by a low level signal in the Series III Storage Tank, which opens the SB-7 solenoid valve, then supplies this water to the Storage Tank. The Polishing Filters are equipped with air and solids purge valves and have a system for back flushing the filters. From the Process System, the water then enters into the MS^3 Membrane System.

Supply Header

The supply header comprises a manifold of piping and valves which allows the operator to select the water source to be supplied to the wash equipment. The operator may select either wash or rinse water to be delivered to the wash equipment.

Rinse water typically is municipally supplied 40-60 psig "tap" water. Recycled wash water will come from one of the following sources depending on system parameters:

1) The CFC system is the primary source of recycled wash water.

Continuous Flow Control System (CFC System)

The CFC system consists of the CFC Pump, the UV/O^3 Chamber, venturi injection, and hydrogen peroxide injection. The purpose of the system is to continuously provide recycled water at moderate supply header pressure and to continuously circulate water through the Catalytic Oxidation Process (CO^3P). The terms CFC and CO^3P are related and the systems utilize the same components. CFC refers to the mechanism for the hydraulic delivery system, and CO^3P refers to the chemical and photochemical process for water treatment.

CFC Pump

The CFC Pump is a 1/2 Hp. centrifugal circulation pump that pumps the processed water from the storage tank to the Supply Header and through the CO^3P system.

Catalytic Oxidation Process (CO^3P System)

The Catalytic Oxidation Process is designed to reduce the Biologic Oxygen Demand (B.O.D.) and Chemical Oxygen Demand (C.O.D) of the recycled water. This is accomplished through the contact with hydrogen peroxide, ozone and ultraviolet light. The tri-reaction is completed when the ultraviolet light (catalyst and oxidizer) in the chamber excites the ozone (oxidizer) and hydrogen peroxide (oxidizer) to cause them to react faster in the aqueous solution (refer to Figure TRI-1). Ultraviolet light is also a remarkable sterilizer of living organics such as bacteria and algae. In turn, the three work together in breaking down organics to clarify the water before it is reused. This is all accomplished by the CFC system, which transfers the water from the tank passing it by the hydrogen peroxide injection and ozone injection and through the UV/O^3 Catalytic Chamber and returning it back to the tank.

RGF Catalytic Oxidation Process

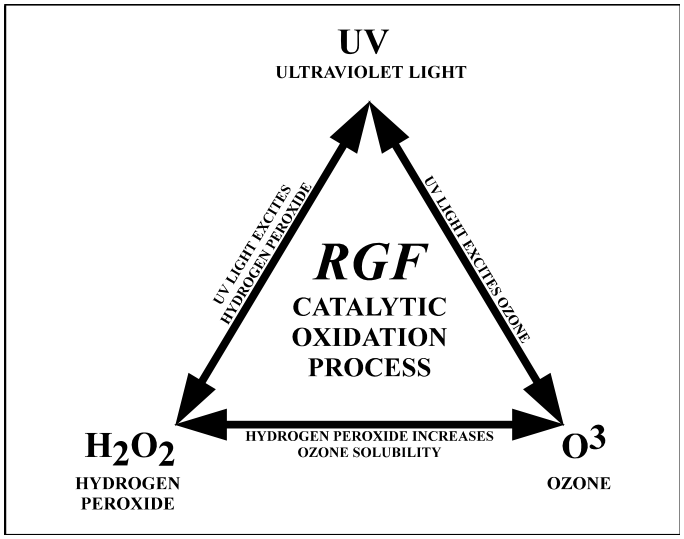


Figure TRI-1

Chemical Injection Pumps (Optional)

Located within the control panel, adds hydrogen peroxide to help control algae, bacteria, and odor. Hydrogen peroxide is an oxidant in the Catalytic Oxidation Process (CO^3P) that also increases ozone solubility.

UV/O3 Catalytic Chamber

A cylindrical vessel used to produce Ozone (O_3) which is venturi injected in the CFC system, to prevent bacteria or algae growth. The chamber also produces ultraviolet light, which is a sterilizer used to UV destruct organics and excite ozone and hydrogen peroxide in the Catalytic Oxidation Process (CO^3P) as the water passes through the chamber (refer to figure UV/O3-1).

UV/O3 Catalytic Chamber

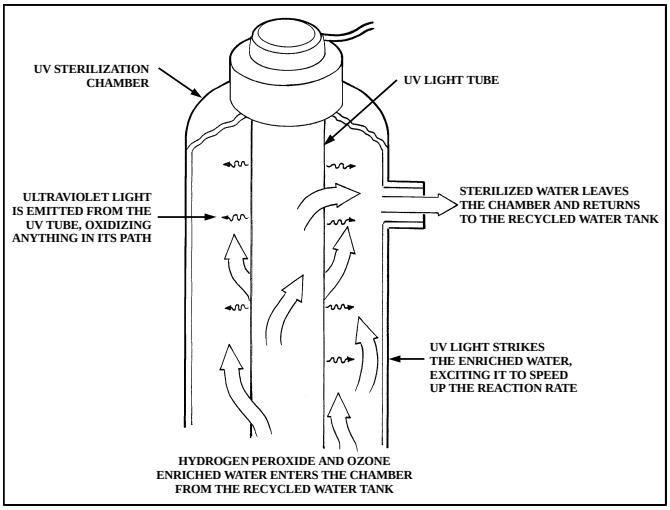


Figure UV/O3-1

Chapter 6: Controlling Water Quality

Overview

Controlling the waste water quality on the **ULTRASORB® System** is a very important process that can greatly enhance the quality of your recycled water. By controlling the pH level, Total Alkalinity, the amount of oxidizers and soaps that are used, you will be able to improve the quality of water in your system. There are many factors which control the water quality. These factors are listed below in order of their appearance in the following section:

pH / Alkalinity

- pH
- Total Alkalinity

Oxidizers

- Hydrogen Peroxide
- Ozone
- Ultraviolet Light

Cleaning Agents

- Enviro-Control
- Water Conditioner 1 (WC-1)

Solids

- Total Dissolved Solids (T.D.S.)
- Total Suspended Solids (T.S.S.)

pH / Alkalinity

pH

pH (potential hydrogen) is a relative measure to indicate how acidic or alkaline a substance is. Thus, it denotes the degree or strength of alkaline or acidity. Some acids or alkaline substances are stronger than others and, in order to compare them, the pH scale has been devised. The pH numerical index ranges from 1.0 (extremely acidic) to 14.0 (extremely alkaline). The midpoint of 7.0 indicates that the solution is neutral. That is, it is neither acidic nor alkaline. Pure distilled water is a neutral solution. Note: High pH's tend to emulsify oils and reduce the efficiency of the unit. The use of high pH cleaners should be minimized.

The pH scale is a logarithmic scale and even though the difference from 0 to 14.0 doesn't seem very great, every unit on the pH scale is a difference of 10 times, and every two units is a difference of 100. For example, if you have an alkaline cleaning solution of 10.0 and increase it to 11.0, you are making that solution 10 times more alkaline. If you go up two degrees to a pH of 12.0, the solution becomes 100 times more alkaline, and so on.

➢ *Controlling pH:*

To Raise pH:

One chemical usually added to raise the pH level is Sodium Carbonate. How much to add is basically a trial and error operation, but a general rule of thumb that is good to follow is to add 1/4 pounds of Soda Ash for every 1,000 gallons of water within the system. After adding the Soda Ash, wait for about an hour before re-checking the pH level. Take whatever further action is indicated by the test.

To Lower pH:

The chemical normally added to lower the pH level is called Muriatic Acid, which is actually a dilute form of the more hazardous hydrochloric acid and comes in liquid form. Another acid product is the so called Dry Acid or Sodium Sulfate, which comes in a granular form. **Acid of any type should always be added directly to the water, NEVER the water to the acid! The amount of acid required is determined by performing an acid demand test with the water test kit.**

Total Alkalinity

Total Alkalinity is the measure of the total amount of alkaline chemicals in the water and **not** the same as pH. pH measures the **strength** of an alkaline (or acid), while alkalinity measures the **amount** of alkalis present. While pH and Total Alkalinity are not the same thing, **Total Alkalinity can have an effect on how fast or easily changes in pH can be accomplished**.

➢ *Controlling Alkalinity*

For our purposes, the **Total Alkalinity should be kept at about 150 ppm**. In general, alkalinity has not been a problem for recycling, providing you are using a **neutral soap**. If you have a drum of water and introduce a scoop of alkaline clearer, you may change the pH and get a reading of 12. That does not mean that if you add a second scoop of cleaner, you will get a different reading - in fact, it will probably be identical. What will change is the Total Alkalinity.

Oxidizers

Hydrogen Peroxide

Hydrogen peroxide is an oxidizer that exhibits outstanding purifying characteristics. It is not affected by the pH level and the only byproducts after oxidation are oxygen and water. Also, the hydrogen peroxide level does not need to be closely controlled. It can have levels ranging from 1 - 10 ppm. It will significantly reduce the amount of B.O.D. (biological oxygen demand) and C.O.D. (chemical oxygen demand) and will also remove any odors that may be present and increase the clarity of the water.

Ozone

Ozone is another oxidizer that exhibits outstanding purifying characteristics. Ozone is different than hydrogen peroxide in that it is not in a liquid form. Ozone is produced by a unique process developed by ***RGF*** in which a special chamber called the **TurboHydrozone®** uses air as it's agent to produce the ozone. A simple look at the blue indicator light on the chamber assures ozone is being produced. The ozonated air is then bubbled inside of the storage tank or is vacuum dragged into the CO^3P System by the Ozone Venturi, which agitates the water thus oxidizing it, which reduces B.O.D.'s and C.O.D.'s, removes odors and improves water clarity.

Ultraviolet Light

Ultraviolet (UV) light is the third oxidizer used by ***RGF*** to complete the catalytic oxidation process (CO^3P). UV light is a sterilizer which kills organics by emitting ultraviolet light inside of the UV Catalytic Chamber. This ultraviolet energy is also used to excite the hydrogen peroxide and the ozone that is already in the water to enhance their individual oxidation potentials.

Cleaning Agents

In discharge systems the use of soaps or chemical additives is not recommended. If one must use detergents or additives they should be neutral pH, quick splitting variety and used sparingly. Cleaning Agents are added to open-looped recycling water systems to help remove the oils and road film off of the equipment being cleaned. Cleaning agents contain surfactants which help to relieve the surface tension of the water, enabling the oils and particles to detach more readily from the equipment being cleaned. Some cleaning agents, however, may cause the oils to emulsify, which will not allow for easy removal which in turn may end up back on the equipment. In order to prevent this, the cleaning agents in consideration for use with the system should be formulated with low to moderate foaming and limited oil

emulsifying properties while remaining a neutral pH cleaner. ***RGF*** recommends the following two cleaning agents to be used with your system.

Enviro-Control

RGF has developed a specially formulated soap for closed-looped recycling systems called **Enviro-Control** to use with your system. This soap is a water white blend of biodegradable surfactants containing all of the qualities listed above, plus it helps prevent bacteria and algae growth, inhibit corrosion. It has no dyes, perfumes or thickeners added, and it helps to flocculate oil accumulation.

Enviro-Control can be purchased in a super concentrated form through your distributor or ***RGF*** at 1-**561-848-1826** or **FAX 1-561-848-9454**.

Water Conditioner-1 (WC-1)

Water conditioners are a good addition to a recycling system because they help to maintain good water quality and help in releasing suspended solids. ***RGF*** has available a water conditioner that can do all of this and more, the **Water Conditioner 1 (WC-1)**. This water conditioner has many water quality improving abilities. It aids in the flocculation of suspended solids, reduces B.O.D. and C.O.D. loading, and helps to soften the water. WC-1 also inhibits corrosion on your system, providing more years of service and will help to lower the total suspended solids count, which will improve the color and clarity of your recycled water. Since WC-1 can provide all of these benefits, it should be made a regular part of the chemical additions to your system.

Dissolved and Suspended Solids

Total Dissolved Solids (T.D.S.)

T.D.S. represents the total conductive material actually dissolved in the water (refer to Section 11.0 Addendums / Training Bulletin - TB 001). It is the same as salt or sugar dissolved in water and should not be confused with suspended solids or turbidity. Total dissolved solids can include both organic and inorganic materials. Inorganic materials can be soluble in many cases and add to T.D.S.. Any chemical addition to the water will increase T.D.S. (except hydrogen peroxide). Water treatment chemicals often solve one problem but create another problem. While an addition of a flocking agent may remove suspended solids and turbidity, it may drastically increase T.D.S.

Eventually, a solution with increasing T.D.S. will reach a level where it is considered to be saturated (i.e. it has reached its solubility constant). Saturation is when the addition of a soluble or dissolved solid reaches the maximum ability of the water to hold it in solution at a given temperature. When the T.D.S. level exceeds this level, the material comes out of solution and either settles or forms crystals, which is how rock candy is made.

T.D.S. is measured by a special conductivity meter which works on the principle that "pure" water has no conductivity of electrical current. The addition of material such as T.D.S. increases the electrical conductivity; therefore, the higher the reading, the higher the T.D.S. level. Readings are in micro Siemens - a unit of low electrical current.

Total Suspended Solids (T.S.S.)

T.S.S. represents the total amount of fine colloidal particles floating in a liquid, too small to settle out, but kept in motion by Brownian movement (refer to Section 11.0 Addendums / Training Bulletins - TB 002). Brownian movement is the rapid vibratory motion of particles suspended in a liquid caused by the bombardment of the particle by the moving molecules of the liquid. The velocity varies inversely with the size of the particles and also depends on the viscosity of the medium. T.S.S., unlike T.D.S. (Total Dissolved Solids), does not dissolve in water and are deemed important because these solids will create unsightly conditions, sludge deposits and a demand for oxygen. Suspended solids can be organic or inorganic.

The standard way of testing waste water for suspended solids is to filter the waste water through a 0.45 μm (1 micron = 1 millionth of a meter) porosity filter. Anything on the filter paper after drying at a temperature of approximately 103°C is considered a portion of the suspended solids. Another way to measure suspended solids is by a device called a spectrophotometer. This device is used to measure photo metrically the quantity of light of a particular wavelength (S.S. = 810 nm) that is absorbed by the suspended solids in solution.

Chapter 7: Engineering Drawings

Outline

System Layout

A recommended layout and stub up locations drawing for the system to adequately accommodate all of the components.

Coalescing Centrifugal Clarifier

An engineered diagram of the Coalescing Centrifugal Clarifier which indicates general layout and dimensions.

Gravity Bag Filter

An engineered diagram of the Gravity Bag Filter which indicates all of the inlet and outlet connections and dimensions, as well as location of major components.

Process Tank

An engineered diagram of the Process Tank which indicates all of the inlet and outlet connections and dimensions associated with the tank.

Series II Equipment Skid

An engineered diagram of the Series II Equipment Skid which indicates all of the inlet and outlet connections and dimensions of the skid, as well as location of major components.

Series III Storage Tank

An engineered diagram of the Series III Storage Tank which indicates all of the inlet and outlet connections and dimensions associated with the tank.

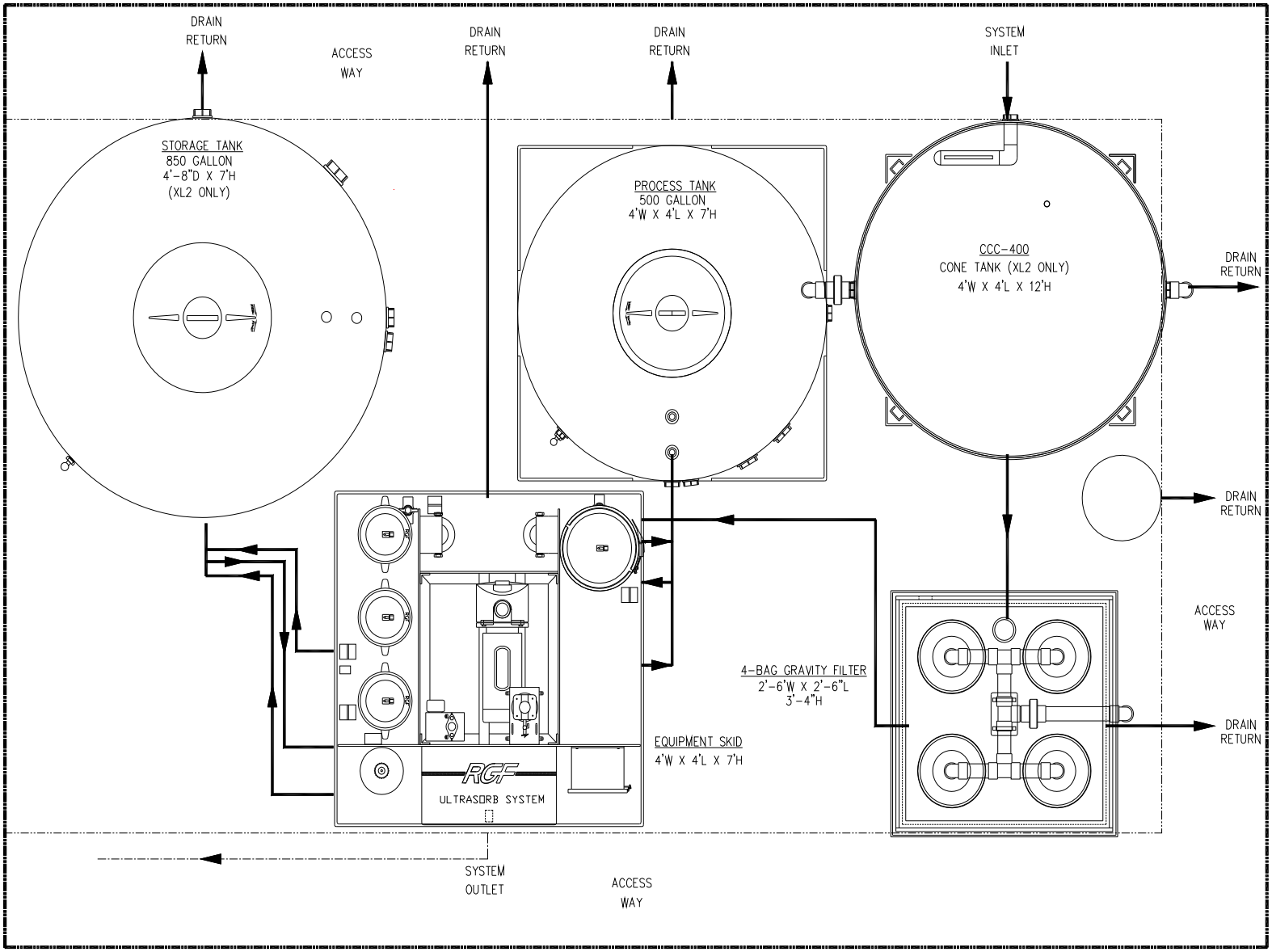
Plumbing & Instrumentation Diagram (P&ID)

An engineered diagram which indicates the flow path of the system outlining placement and nomenclature of valves, pressure gauges and unions.

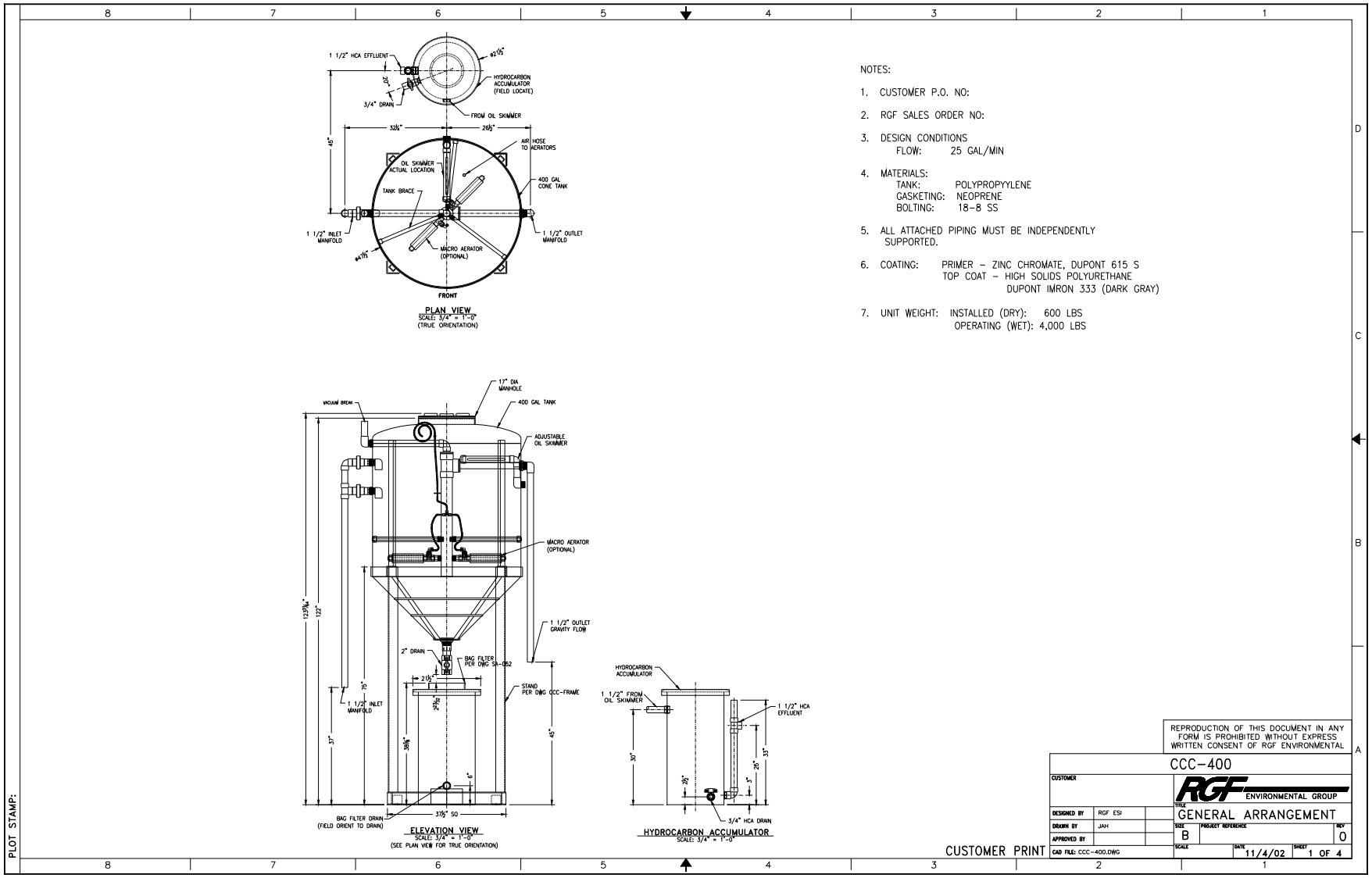
Electrical Diagram

An engineered diagram of the electrical connections and components associated with the system. This diagram is a very useful tool for the electrician when the installation is performed.

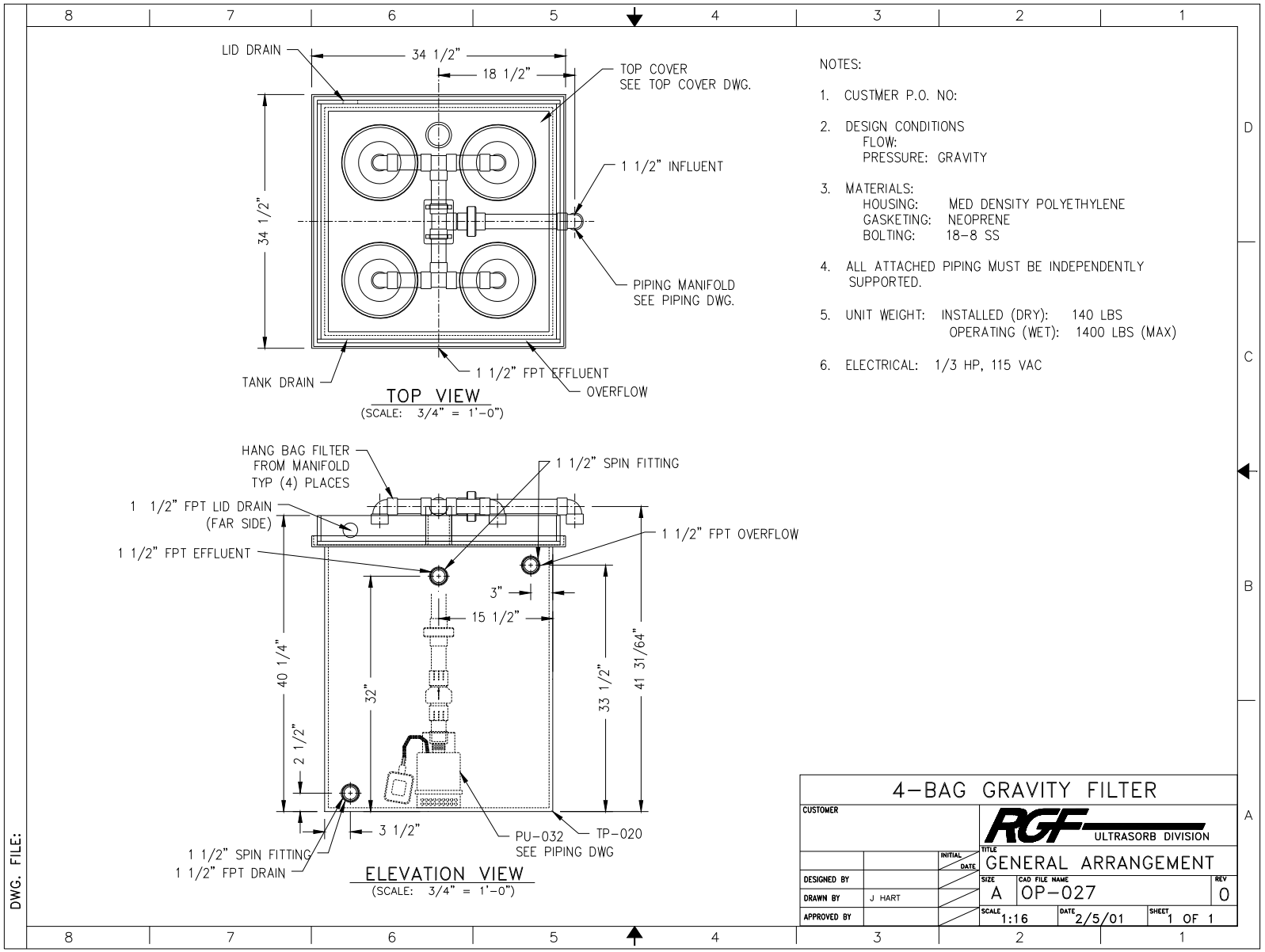
System Layout



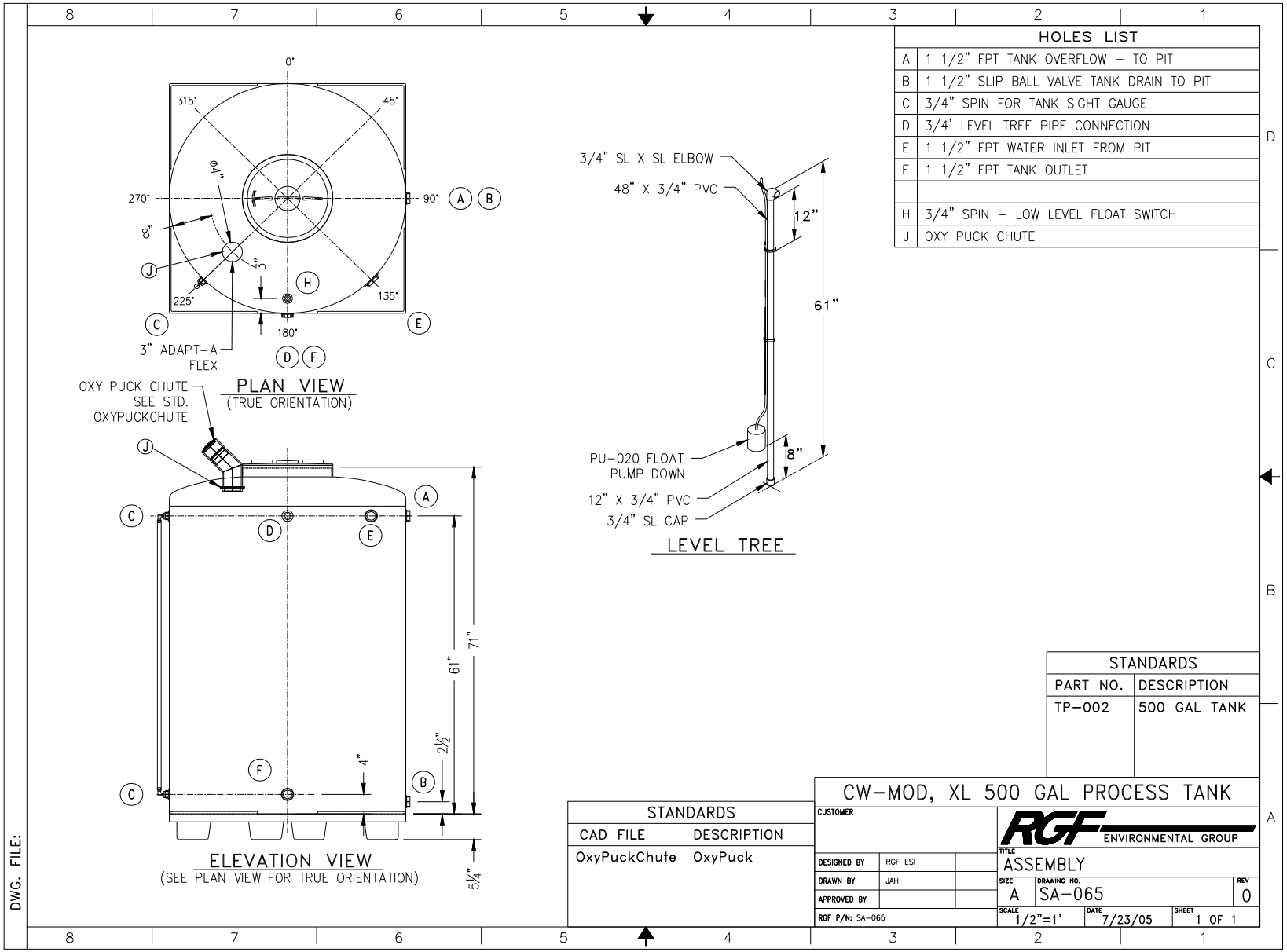
Coalescing Centrifugal Clarifier



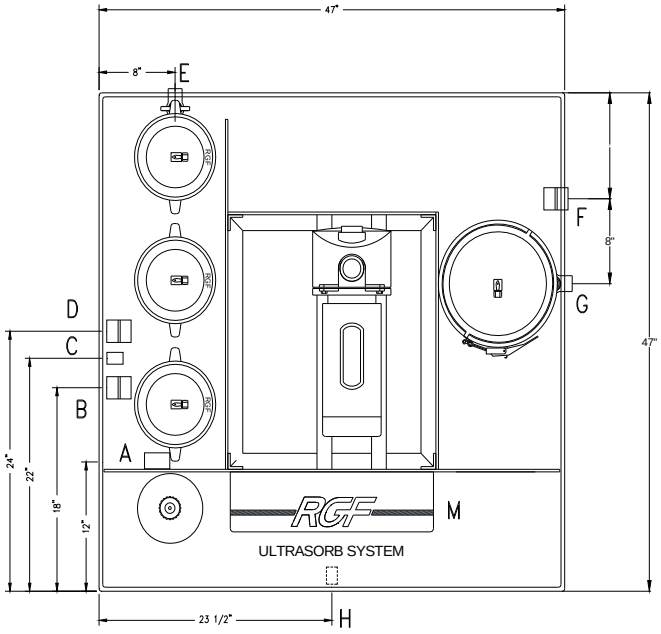
Gravity Bag Filter



Process Tank



Series II Equipment Skid



FRONT

SYSTEM CONNECTIONS

A – CFC SYSTEM RETURN (TO STORAGE TANK)
3/4" SLIP UNION

B – CFC SYSTEM INLET (FROM STORAGE TANK)
1 1/2" FPT

C – FRESH WATER INLET
3/4" FPT

D – PRODUCT WATER OUTLET (TO STORAGE TANK)
1 1/2" FPT

E – POLISH FILTER DRAINS (TO MAIN DRAIN)
3/4" SLIP BALL VALVE (PD-1)

F – SYSTEM INLET (FROM UPSTREAM COMPONENT)
1 1/2" FPT (PF-4)

G – HYDROCARBON ACCUMULATOR DRAIN (TO MAIN DRAIN)
3/4" SLIP BALL VALVE (HCA-2)

H – SYSTEM SUPPLY HEADER
1 1/2" FPT

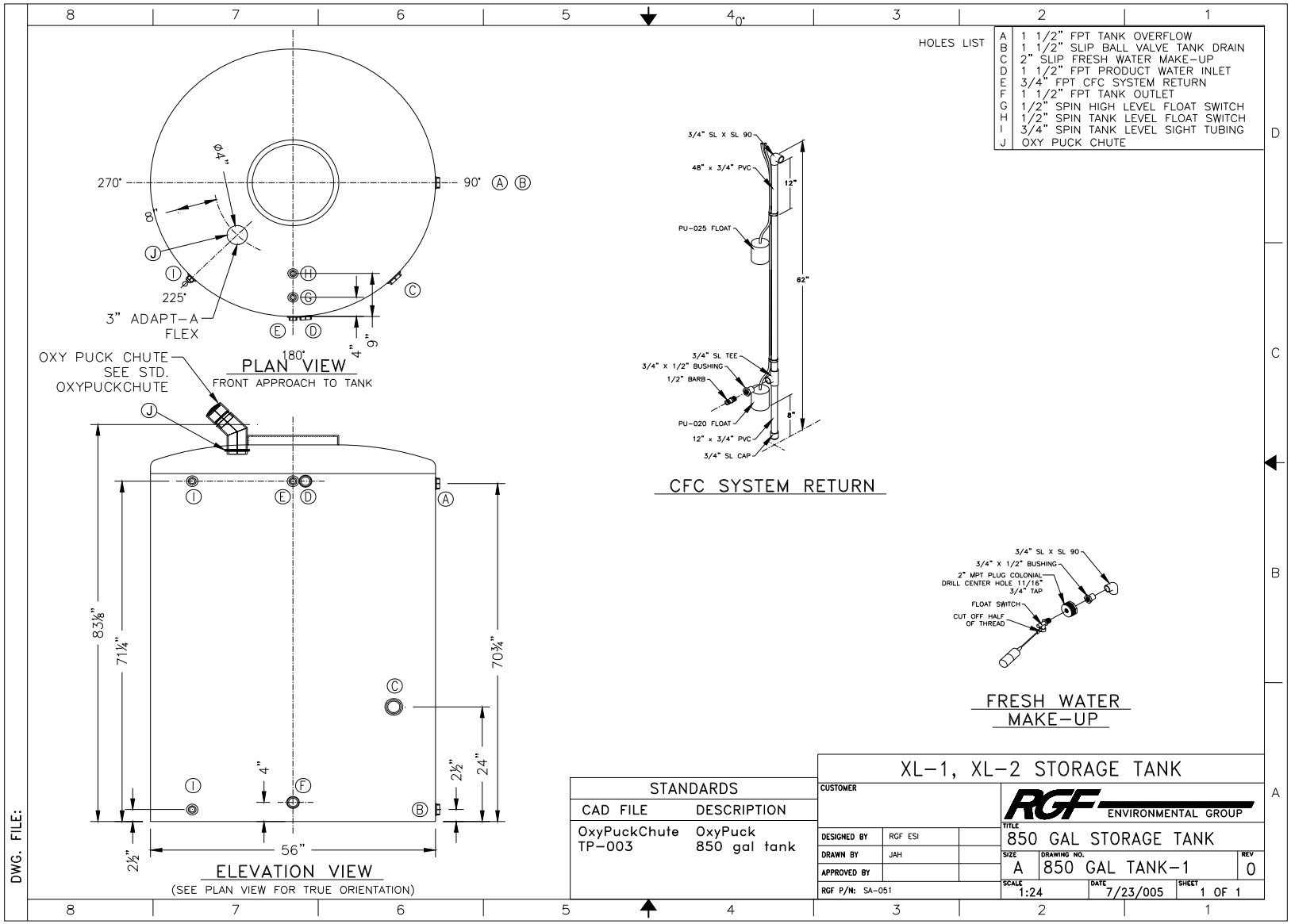
M – 220 VAC MAIN ELECTRICAL FEED (SIDE OF BOX)
30 AMP, 60 Hz, SINGLE PHASE W/NEUTRAL&GROUND

NOTE:
EQUIPMENT SKID IS DESIGNED FOR THE STORAGE TANK TO BE LOCATED TO THE LEFT OF THE SKID.

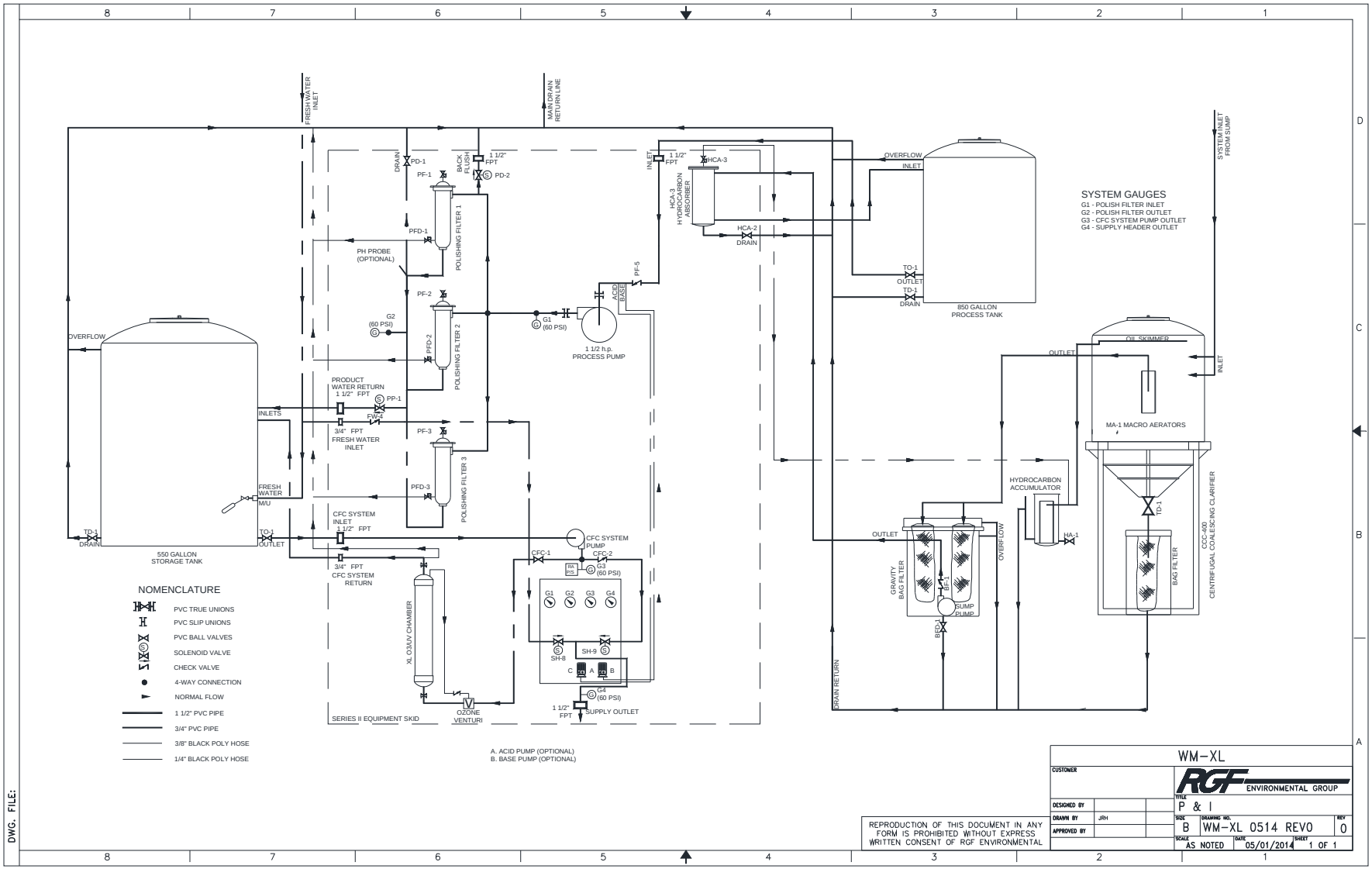
	WM-XL
CUSTOMER	RGF ENVIRONMENTAL GROUP
DESIGNED BY: EG	TITLE: WM-XL SERIES II SKID
DRAWN BY: JRH	SIZE: B; DRAWING NO.: WM-XL 0514 REV0; REV: 0
APPROVED BY:	SCALE: AS NOTED; DATE: 05/01/2014; SHEET: 4 OF

DWG. FILE:

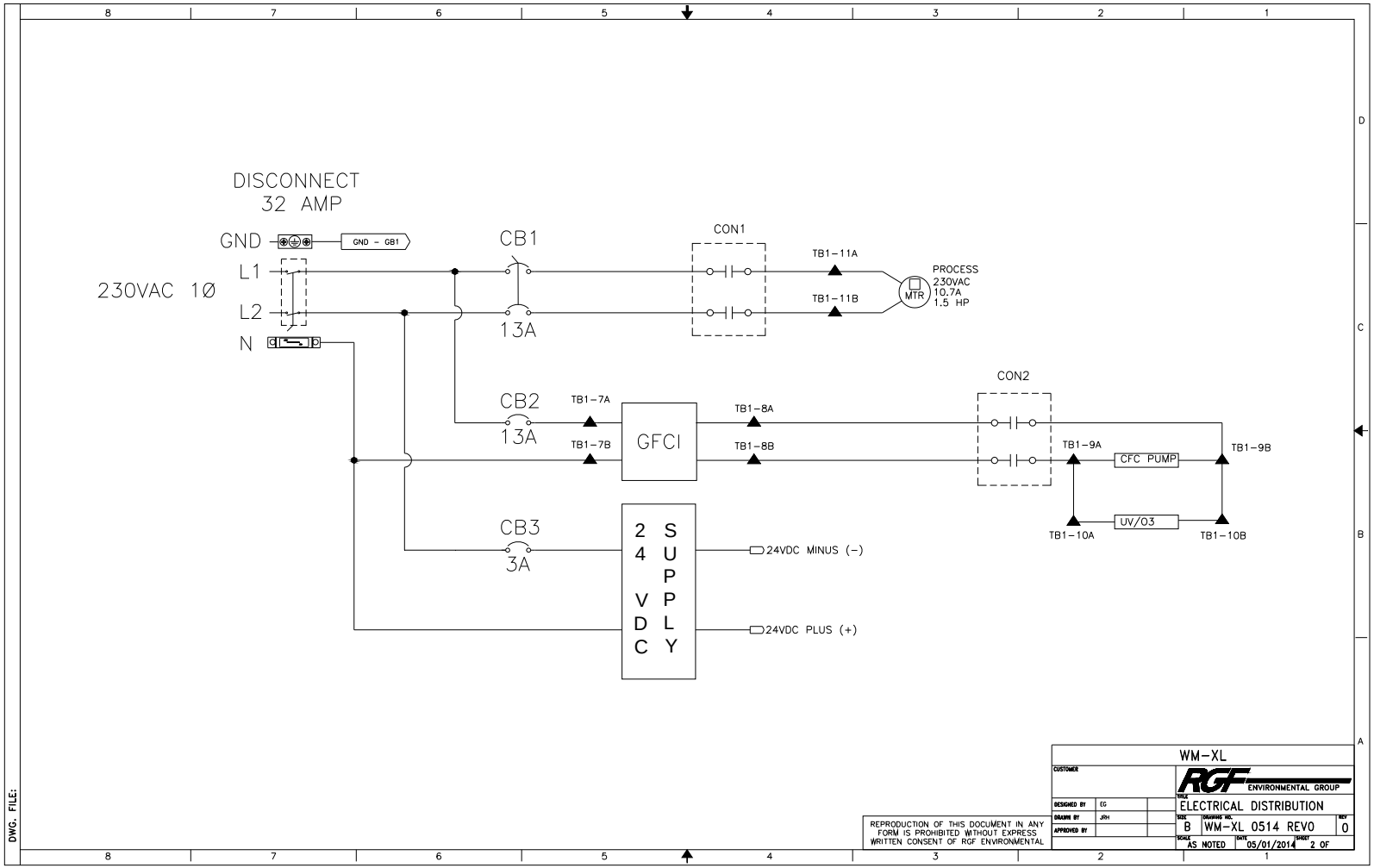
Series III Storage Tank



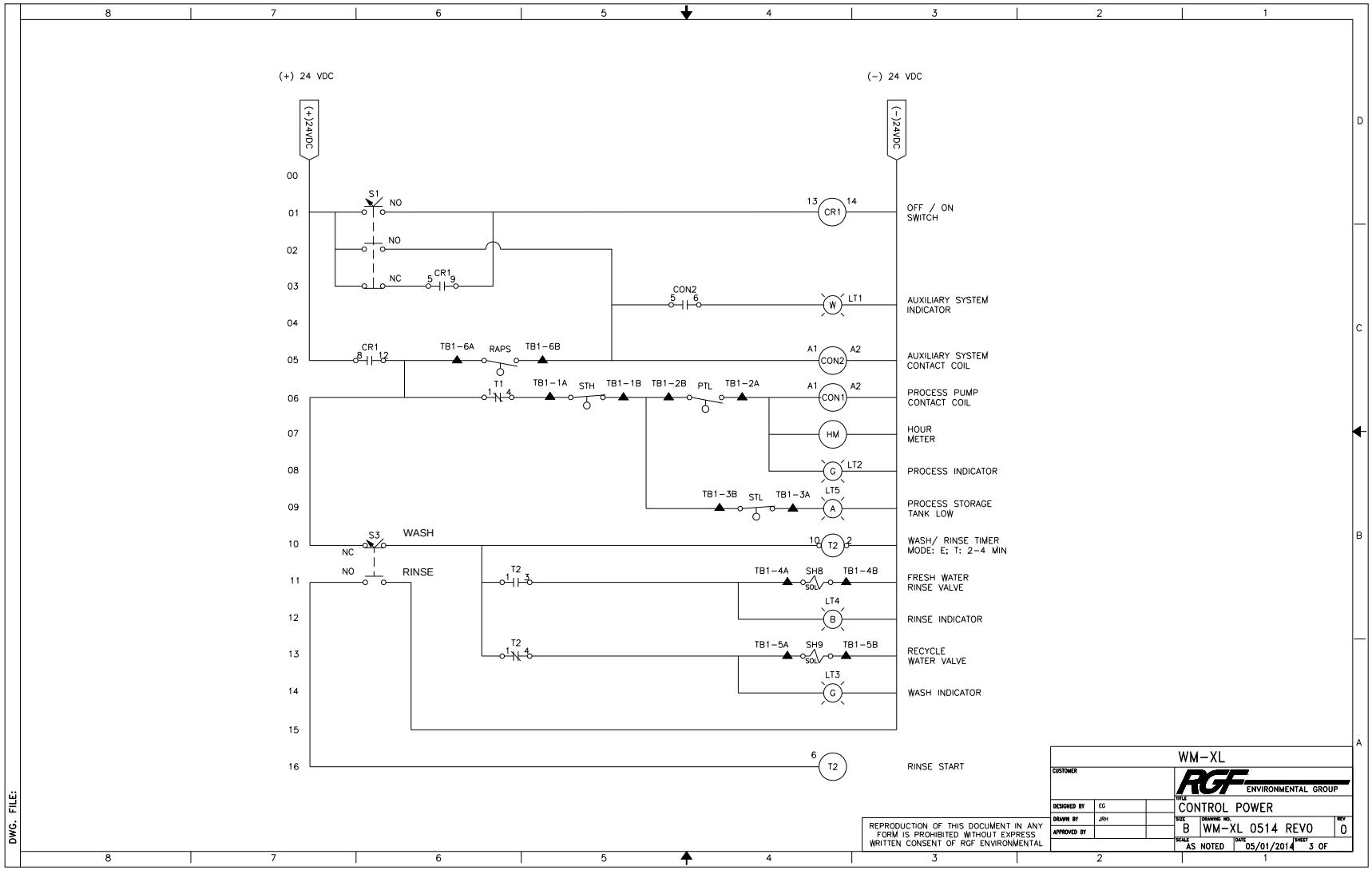
Piping & Instrumentation Diagram



Electrical Diagram



ELECTRICAL CONTROL POWER



Chapter 8: Troubleshooting

Flow

SYMPTOM	PROBABLE CAUSE	SOLUTION
PROCESS SYSTEM		
1. PROCESS PUMP NOT OPERATING	A) POWER IS NOT APPLIED TO PUMP	A) VERIFY POWER IS APPLIED; THE PROCESS SYSTEM CONTROL SWITCH IS IN THE PROCESS POSITION AND THE BREAKER IS SHUT. ENSURE FLOAT SWITCHES ARE PROPERLY POSITIONED, UNOBSTRUCTED AND FREE TO SWING AND ADEQUATE WATER IS IN BOTH SUCTION AND DISCHARGE TANKS ENSURE THE PROPER ELECTRICAL CONNECTIONS WERE MADE TO THE SYSTEM. REFER TO THE PROCESS PUMP COMPONENT MANUAL.
	B) PUMP HAS LOST PRIME	B) VERIFY SYSTEM LINEUP. ENSURE UNOBSTRUCTED FLOW TO PUMP SUCTION. REPRIME PUMP ENSURING THAT PUMP CASING IS WATER FILLED. OPEN THE PRIMING PLUG AND RE-PRIME PUMP.
	C) SYSTEM VALVES ARE IMPROPERLY ALIGNED	C) CONDUCT VALVE LINEUP WITH P&ID.
2. NO OR LOW FLOW THROUGH PROCESS SYSTEM	A) POLISH FILTERS ARE CLOGGED WITH PARTICULATE	A) PERFORM A POLISHING FILTER BACK FLUSH IN ACCORDANCE WITH PMS. IF THIS DOES NOT REMEDY PROBLEM THEN FILTERS ARE FOULED AND NEED TO BE REPLACED.

CFC SYSTEM		
1. CFC PUMP NOT OPERATING	A) POWER IS NOT APPLIED TO PUMP	A) VERIFY POWER IS APPLIED; BREAKER IS SHUT. ENSURE THE PROPER ELECTRICAL CONNECTIONS WERE MADE TO THE SYSTEM. REFER TO THE CFC PUMP COMPONENT MANUAL.
	B) PUMP HAS LOST PRIME	B) CHECK WATER LEVEL IN STORAGE TANK. ENSURE UNOBSTRUCTED FLOW TO PUMP SUCTION. REPRIME PUMP ENSURING THAT PUMP CASING IS WATER FILLED. CONDUCT VALVE LINEUP WITH P&ID.
	C) SYSTEM VALVE IS IMPROPERLY ALIGNED	C) CONDUCT VALVE LINEUP WITH P&ID.
2. UV/O3 CHAMBER ON HOUSING IS OFF	A) OZONE GENERATOR IS DEFECTIVE	A) CALL YOUR DISTRIBUTOR OR RGF FOR FURTHER TROUBLESHOOTING ADVICE.
3. UV/O3 CHAMBER LEAKS	A) UV BULB RUBBER GROMMET IS IMPROPERLY SEATED.	A) RE-SEAT BULB INTO GROMMET.
	B) UV CHAMBER IS OVER PRESSURIZED	B) ENSURE UNOBSTRUCTED FLOW. CONDUCT VALVE LINEUP WITH P&ID.
	C) INNER CHAMBER GLASS IS CRACKED OR BROKEN.	C) INNER CHAMBER MUST BE REPLACED.
4. CHEMICAL INJECTION PUMP NOT OPERATING CORRECTLY.	A) POWER IS NOT APPLIED TO PUMP	A) CHECK FOR POWER TO THE PUMP.
	B) LOW OR EMPTY CHEMICAL CONTAINER.	B) FILL CHEMICAL CONTAINER WITH APPROPRIATE MIXTURE.
	C) SUCTION AND DISCHARGE HOSES ARE KINKED.	C) CHECK HOSES FOR KINKS. REMOVE PUMP FLEXIBLE HOSE REALIGN AND REPLACE.
	D) PUMP IS NOT RUNNING.	D) CHECK CHEMICAL METERING KNOB FOR SETTING. IF NOT OFF, AND PUMP STILL NOT RUNNING, THEN PUMP IS DEFECTIVE.

Electrical

The Ultrasorb® system should be installed by a licensed electrician and should have a properly sized over current protection (i.e. circuit breaker) device installed upstream of the device. Electrical Troubleshooting should be conducted by an electrically trained individual after he has carefully reviewed the electrical drawing in Section 8.3. All indications should be considered: LED illumination, pump rotation and fluid flow.

SYMPTOM	PROBABLE CAUSE	SOLUTION
PROCESS SYSTEM		
1. INDICATOR LIGHTS NOT OPERATING	A) POWER IS NOT APPLIED	A) VERIFY POWER IS APPLIED; THE SYSTEM
	B) LIGHT IS BLOWN OUT	B) CONSULT TECHNICIAN OR REMOVE 4X4 ELECT. BOX FROM REAR OF PANEL AND REPLACE LIGHT.
	C) LOOSE WIRES	C) CHECK ALL WIRE CONNECTIONS WITH MAIN POWER TURNED OFF AND TIGHTEN IF LOOSE.
	D) BAD GROUND	D) OPEN MAIN ELECT. BOX , CHECK GROUND STRIPS FOR LOOSE WIRE THEN TIGHTEN, IF NECESSARY
2. PROCESS SWITCHES NOT OPERATING	A) POWER IS NOT APPLIED	A) VERIFY POWER IS APPLIED; THE SYSTEM CONSULT TECHNICIAN OR REMOVE 4X4 ELECT. BOX FROM REAR OF PANEL AND REPLACE.
	B) LOOSE WIRES	B) CHECK ALL WIRE CONNECTIONS WITH MAIN POWER TURNED OFF AND TIGHTEN IF LOOSE.
	C) BAD GROUND	C) OPEN MAIN ELECT. BOX , CHECK GROUND STRIPS FOR LOOSE WIRE THEN TIGHTEN IF NECESSARY
	D) BLOWN SWITCH	D) REMOVE 4X4 BOX ON REAR OF PANEL AND REPLACE PER ELECT. DIAGRAM.
3. UV/O3 LIGHT NOT OPERATING	A) GFI BLOWN BREAKER	A) OPEN GFI COVER AND PRESS RESET
	B) GFI LOOSE WIRES	B) CHECK ALL WIRE CONNECTIONS WITH MAIN POWER TURNED OFF AND TIGHTEN IF LOOSE.
	C) BURNED OUT BULB	C) CALL RGF OR YOUR DISTRIBUTOR

Chemistry

SYMPTOM	PROBABLE CAUSE	SOLUTION
CHEMICAL		
1. EFFLUENT RECYCLED WATER SMELLS	A) HYDROGEN PEROXIDE FEED SYSTEM SOLUTION IS LOW OR EMPTY. B) HYDROGEN PEROXIDE FEED SYSTEM IS NOT WORKING PROPERLY. C) UV/O3 CHAMBER NOT OPERATING.	A) REFILL HYDROGEN PEROXIDE FEED SYSTEM. B) REFER TO THE LMI PUMP OPERATION MANUAL. C) SEE ELECTRICAL: UV/O3 CHAMBER NOT OPERATING.
2. EFFLUENT RECYCLED WATER IS VERY CLOUDY.	A) HYDROGEN PEROXIDE FEED SYSTEM SOLUTION IS LOW OR EMPTY. B) HYDROGEN PEROXIDE FEED SYSTEM IS NOT WORKING PROPERLY. C) UV/O3 CHAMBER NOT OPERATING. D) THE WATER CONDITIONER (WC-1, OPTIONAL) HAS NOT BEEN ADDED OR RESIDUAL LEVEL IS LOW.	A) REFILL HYDROGEN PEROXIDE FEED SYSTEM. B) REFER TO THE LMI PUMP OPERATION MANUAL C) SEE ELECTRICAL: UV/O3 CHAMBER NOT OPERATING. D) INCREASE THE WC-1 INJECTION RATE.

NOTE:

If repeated attempts to reduce smell or clear up the recycled water fail to improve the water quality, or if the amount of soap needed to clean adequately rises to an unacceptable level. the water has become overburden with dissolved and suspended solids. The system should be drained and the spent water disposed of in accordance with local, state and federal regulations.

Chapter 9: Replacement Parts

General Ordering Information

When preparing to order replacement parts for your system:

- Have the **Model #** and **Serial #** of the unit ready when trying to order.
- Have the ship to address ready.
- Identify the part needed with the part # and description and call *RGF* or your local distributor to place an order.

Replacement Parts List

The following is a list of commonly needed replacement parts.

PART #	DESCRIPTION

Filters And Parts

FL-009	25 MICRON BAG FILTER (4 BAG) (CCC)
FL-03PX	HCA-3 ABSORBER
FP-37	GASKET KIT FOR HCA-3 HOUSING
FL-86	5” DIA. POLISHING FILTER (25 M)
FP-51	O-RING FOR POLY FILTER HOUSING
FL-04	BACK FLUSH CARTRIDGE FILTER (20 MICRON)

Chemicals

HY-01	HYDROGEN PEROXIDE 35% SOLUTION
EC-1-5	ENVIRO-CONTROL - 55 GALLONS
WC-1-5	WC-1 WATER CONDITIONER - 5 GALLONS

Pumps And Parts

PU-131	1/2 Hp. CFC SYSTEM PUMP
PU-140	1-1/2 Hp. CENTRIFUGAL PROCESS PUMP
PU-142	VITON SEAL FOR 1 1/2 Hp., PUMP
PU-32	1/3 Hp. S.S. LIFT STATION SUMP PUMP
PU-20	PUMP UP FLOAT SWITCH (30' CORD)
PU-25	PUMP DOWN FLOAT SWITCH (30' CORD)
PU-29Y	PERISTALTIC CHEMICAL INJECTION PUMP

Valves And Unions

VA-06-1	3/4" PVC BALL VALVE
VA-06-4	1 1/2" PVC BALL VALVE
VA-37	3/4” SOLENOID VALVE ASSEMBLY (NORMALLY CLOSED)
VA-38	3/4” ELECTRIC SOLENOID COIL ONLY (120 VAC)
VA-XX	1 1/2” SOLENOID COIL ONLY (120 VAC)
VA-22	1/2” BRASS FLOAT VALVE WITH FLOAT
VA-56	1 1/2” SOLENOID VALVE ASSEMBLY (NORMALLY CLOSED)
PF-253	3/4" PVC UNION
PF-256	1 1/2" PVC UNION
VA-51	1/4" FPT X 3/8" TUBE 90 DEG PVC VALVE

Misc. Parts

SA-006T-16	UV/O3 8” CHAMBER
PT-117	OZONE VENTURI
PT-12	*RGF* GREY TOUCH-UP PAINT
HF-23	1/4" O.D. POLYETHYLENE TUBING

Chapter 10: Sub-Component Manuals

GFI Reset

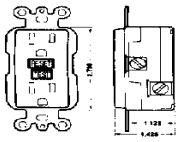
LEVITON

How To Install & Test Your GFCI Outlet

Ground Fault Circuit Interrupter Duplex Receptacle

TO BE INSTALLED AND/OR USED IN ACCORDANCE WITH APPROPRIATE ELECTRICAL CODES AND REGULATIONS

ALL MODELS 125V AC 60Hz ONLY
20A Feed-Through Rating, 15A Outlet Rating
Cat. No. 6490, -I, -W Feed-Through without Indicator Light
Cat. No. 6598, -I, -W with Indicator Light
Cat. No. 6599, -I, -W without Indicator Light
Catalog Number indicates Brown Color, -I Ivory, -W White



GFCI: Standard 943
Class A
Receptacle (Outlet)
Standard 498
UL LISTED

GENERAL CAUTIONS AND WARNINGS - READ THIS FIRST!
Carefully read the instructions appropriate to your needs. IF YOU DO NOT UNDERSTAND ANY PART OF THEM, CONSULT A QUALIFIED ELECTRICIAN.

- Install only on a GROUNDED 120-Volt AC circuit protected by a fuse or circuit-breaker. **EXCEPTION:** Where a grounding means does not exist in the receptacle enclosure, either a non-grounding or ground-fault circuit-interrupter-type receptacle shall be used. [See NEC210-7(d) Exception 1993] In this application, DO NOT connect a grounding conductor from the GFCI to any outlet supplied from the GFCI receptacle.
- Do NOT install to replace a duplex outlet in which the two halves of the duplex are controlled by different fuses or circuit breakers.
- If the circuit you wish to protect is controlled by a double pole circuit breaker or by two fuses, see APPENDIX.
- For testing procedure refer to Step A-10.

WARNING: This device is not to be used directly or indirectly with life support apparatus or associated circuitry.
CAUTION:Do not paint this device, it may not work properly!

1.

WHAT THE GFCI DOES FOR YOU

This device protects you against hazardous electrical shock that may be caused if your body becomes a path through which electricity travels to reach ground. This could happen when you touch an appliance or cord that is 'live' through faulty mechanism, damp or worn insulation, etc. You could be touching plumbing or other material that leads to ground.

When protected by the GFCI you may still feel a shock, but the GFCI should cut it off quickly enough so a person in normal health should not have serious electrical injury (infants and very small children may still be affected.)

WARNING: The GFCI will NOT protect against:

- Line-to-line shocks like the kind gotten by touching metal inserted in both straight slots of an outlet..
- Current overloads or line-to-line short circuits; **the fuse or circuit breaker at the distribution box or panel must provide such protection.**

CAUTION: If the GFCI trips of its own accord this indicates a possible ground fault condition which is potentially hazardous. Investigate the ground fault condition at once by making a thorough check to determine where the ground fault exists in the equipment plugged into your GFCI. Correct the defect at once. Carry out the test procedure as outlined to ensure that your GFCI is operating properly. If the GFCI does not reset this indicates a ground fault still exists and must be corrected.

BEFORE INSTALLATION
CAREFULLY READ THE FOLLOWING:

IMPORTANT: There are three possible options you may choose from to properly install your GFCI.

Read the following three options to determine which set of instrcutions are appropriate for the option you want.

The GFCI can be wired so that protection against ground faults is provided at its own outlets **ONLY**. (follow instruction A)

The GFCI can be wired so that protection against ground faults are provided to ALL outlets on the same branch circuit, including the GFCI outlets. (Follow Instruction B)

The GFCI can be wired so that protection is provided to SOME outlets on the same branch circuit including the GFCI outlets. (Follow Instrcution C)

2.

GROUND FAULT CIRCUIT INTERRUPTER
DUPLEX RECEPTACLE
HOMEOWNERS TEST RECORD

TEST REMINDER

FOR MAXMUM PROTECTION AGAINST ELECTRICAL SHOCK HAZARD OPERATE TEST SWITCH ON GROUND FAULT CIRCUIT INTERRUPTER AT LEAST ONCE A MONTH.

RECORD DATE

PLACE THIS TEST RECORD IN A CONSPICUOUS PLACE AS A REMINDER TO TEST REGULARLY.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
19												
19												
19												
19												
19												
19												
19												
19												
19												
20												
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20												
20												
20												
20												
20												

SEE TEST PROCEDURE ABOVE

LEVITON
LEVITON MANUFACTURING CO., INC.
59-25 Little Neck Pkwy., Little Neck, NY 11362-2591

TEST PROCEDURE

Like a fire extinguisher or other safety device your GFCI outlet should be checked every month to make sure it is operating properly to protect you. Just follow the simple instructions below and then enter the date of the test on the reverse side of this card.

1. Push black TEST button. Red RESET button should pop out from inner surface. This should result in power being OFF at all outlets protected by the GFCI. Verify by plugging test lamp into every such outlet. If your GFCI has an indicator Light, this light should be ON when circuit is complete. Test with test lamp to determine condition of circuit and proper operation of indicator Light.

CAUTION: If RESET button does not pop out or if test lamp or indicator light remains lit when RESET button **does not** pop out DO NOT USE ANY OUTLETS ON THE CIRCUIT CALL A QUALIFIED ELECTRICIAN.

2. If the GFCI tests okay, restore power by pushing the RESET button back in THE RESET BUTTON MUST BE PUSHED FIRMLY AND FULLY INTO PLACE UNTIL IT LOCKS AND REMAINS DEPRESSED AFTER PRESSURE HAS BEEN REMOVED IF THE GFCI FAILS RESET PROPERLY DO NOT USE — CALL A QUALIFIED ELECTRICIAN. Test lamp and/or Indicator Light should again light.

3. IF GFCI TRIPS BY ITSELF at any time during or after installation reset and perform test procedures 1 and 2 above. IF RESET BUTTON DOES NOT POP OUT WHEN TEST BUTTON IS DEPRESSED, **DO NOT USE GFCI**. CALL A QUALIFIED ELECTRICIAN.

10.

BGT

ITT

Residential Water Systems

Goulds Pumps

GT IRRI-GATOR™ Self-Priming① Centrifugal Pumps – 60 Hz

New base on 1½ – 3 HP models.

GOULDS PUMPS

Goulds Pumps is a brand of ITT Corporation.

www.goulds.com

Engineered for life

FEATURES

① ■ **Self-Priming Design:** Once pump is primed, filled with water, it never needs priming again even if water level drops below the end of the suction pipe. Pumping resumes once the water level rises above the end of the suction pipe.

■ **Serviceable:**
- Back pullout design allows disassembly of pump for service without disturbing piping.
- Two compartment motor for easy access to motor wiring and replaceable components.

■ **Diffuser (Guidevane):** Bolt down diffuser provides positive alignment with impeller. Diffuser has stainless wear ring for extended performance in abrasive conditions. F.D.A. compliant, injection molded, food grade, glass filled Lexan® for durability and abrasion resistance.

■ **Impeller:** F.D.A. compliant, glass filled Noryl®. Corrosion and abrasion resistant.

■ **Corrosion Resistant:** Electro-coat paint process is applied inside and out, then baked on.

■ **Casing:** Cast iron construction. Four (4) bolt, back pull-out design. Tapped openings provided for vacuum gauge and casing drain.

■ **Powered for Continuous Operation:** Pump ratings are within the motor manufacturer's recommended working limits. Can be operated continuously without damage.

■ **Mechanical Seal:** Carbon/ceramic faces, BUNA elastomers. 300 series stainless steel metal parts. Pump design prevents the seal from running dry.

ITT

GOULDS PUMPS
Residential Water Systems

APPLICATIONS

Specifically designed for the following uses:

- Lawn sprinkling
- Irrigation
- Air conditioning systems
- Heat pumps
- Water transfer
- Dewatering

SPECIFICATIONS

Pump:

- Pipe connections: 1½" NPT suction 1½" NPT discharge
- Capacities: to 110 GPM at 5 foot suction lift.
- Heads: to 128 feet.
- Reprime capabilities: to 25 feet suction lift.
- Maximum working pressure: 125 PSIG.
- Maximum water temperature: 140° F (60° C).
- Rotation: clockwise when viewed from motor end.

Motor:

- NEMA standard open drip proof.
- 60 Hz, 3500 RPM.
- Stainless steel shaft.
- Single phase: ¾–1½ HP, 115/230 V; 2 and 3 HP, 230 V only. Built-in overload with automatic reset.
- Three phase: 230/460 V. Overload protection must be provided in starter unit. Starter and heaters (3) must be ordered separately.
- Optional TEFC motors are available. See price book for order numbers.

AGENCY LISTINGS

Canadian Standards Association

Underwriters Laboratories

Goulds Pumps is ISO 9001 Registered.

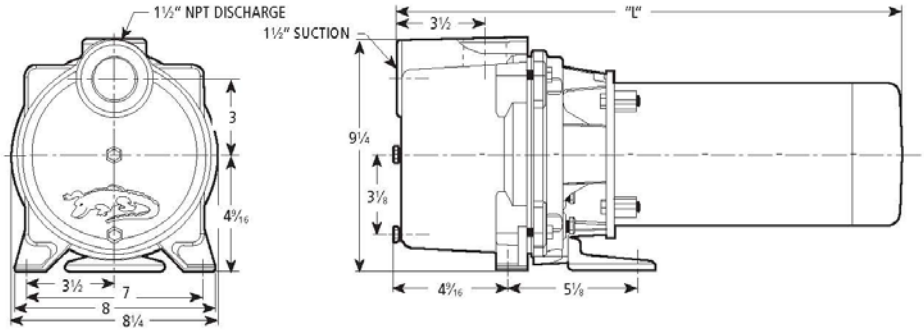
STANDARD ODP MODELS

Model	HP	Phase
GT07	¾	1
GT10	1	
GT15	1½	
GT20	2	
GT30	3	
GT073	¾	3
GT103	1	
GT153	1½	
GT203	2	
GT303	3	

DIMENSIONS AND WEIGHTS

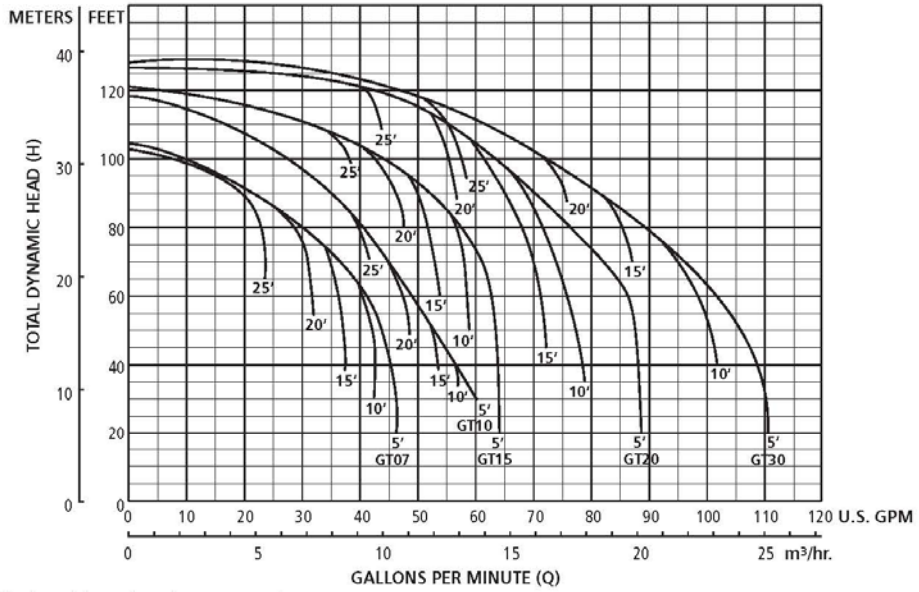
Model	GT07	GT10	GT15	GT20	GT30	GT073	GT103	GT153	GT203	GT303
HP	¾	1	1½	2	3	¾	1	1½	2	3
Length "L"	19 1/16	19 7/8	21 3/16	20 9/16	21 11/32	19	19 3/4	20 1/16	20 13/16	21 3/16
Width	8¼									
Height	9¼									
Weight (lbs.)	48	52	60	65	76	49	52	55	69	71
Phase	Single					Three				

(All dimensions are in inches and weights in lbs. Do not use for construction purposes.)



2

PERFORMANCE CURVE



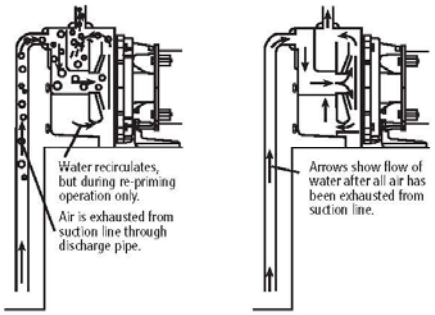
Single and three phase have same performance.

PERFORMANCE RATINGS

Model	PSI Discharge Pressure	Suction Lift in Feet				
		5	10	15	20	25
GT07/ GT073	20	44	41	36	31	24
	30	34	31	26	22	14
	40	10	4	0	0	0
GT10/ GT103	20	53	51	49	46	41
	30	43	41	38	36	32
	40	29	22	16	8	0
GT15/ GT153	20	63	59	54	49	39
	30	60	55	51	46	37
	40	45	38	33	20	14
GT20/ GT203	20	86	77	70	59	46
	30	80	72	67	57	44
	40	65	60	57	50	43
GT30/ GT303	20	105	100	88	76	60
	30	92	90	84	75	57
	40	73	67	62	55	50

Performance ratings are in GPM.

SELF-PRIMING (AFTER INITIAL PRIME)①

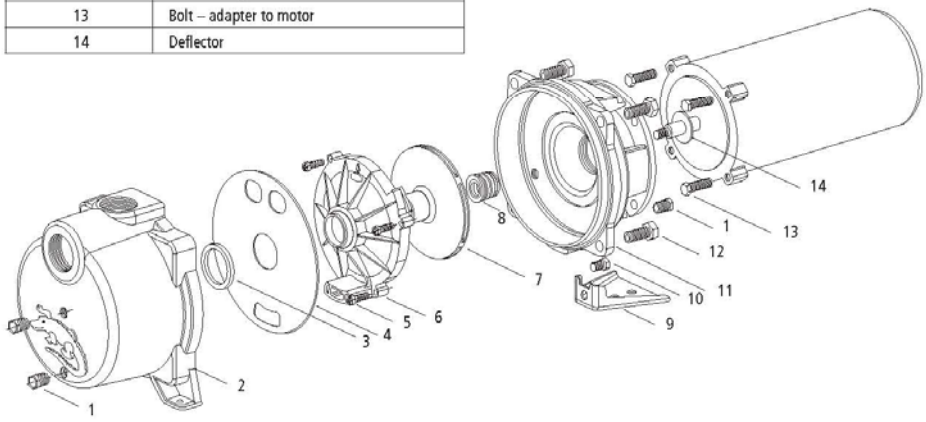


ITT

Residential Water Systems

COMPONENTS

Item No.	Description
1	Plug – ¼" NPT
2	Casing
3	Seal ring – diffuser
4	Diaphragm
5	Machine screw
6	Diffuser
7	Impeller
8	Mechanical seal
9	Foot
10	Bolt – foot to adapter
11	Motor adapter
12	Bolt – casing to adapter
13	Bolt – adapter to motor
14	Deflector



GOULDS PUMPS

BGT June, 2008

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CFC System Pump

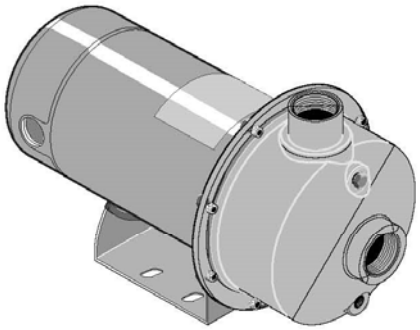
ERKELEY®

OWNER'S MANUAL

INSTALLATION AND OPERATING INSTRUCTIONS
REPAIR PARTS LIST

"SSCX" AND "SSCXS" SERIES CENTRIFUGAL PUMP

High Head



MODELS

HP	Model Number	ODP MOTORS 115/230/60/1	ODP MOTORS 208-230/460/60/3	TEFC MOTORS 115/230/60/1	TEFC MOTORS 208-230/460/60/3
1/2	SS1XN-½	B78635	B78636	B78647	B78648
3/4	SS1XN-¾	B78637	B78638	B78649	B78650
3/4	SS1XS-¾	B82411	B82412	B82413	B82414
1	SS1XN-1	B78639	B78640	B78651	B78652
1	SS1XS-1	B82415	B82416	B82417	B82418
1-1/2	SS1XN-1½	B78641	B78642	B78653	B78654
1-1/2	SS1XS-1½	B82419	B82420	B82421	B82422
2	SS1¼XN-2	B78643*	B78644	B78655*	B78656
2	SS1XS-2	B82423*	B82424	B82425	B82426
2-1/2	SS1¼XN-2½	B78645*	B78646	B78657*	B78658
2-1/2	SS1XS-2½	B82427*	B82428	B82429*	B82430

* 230 Volt only.

Berkeley Pumps / 293 Wright Street / Delavan, WI 53115

BE495 (Rev. 1/8/04)

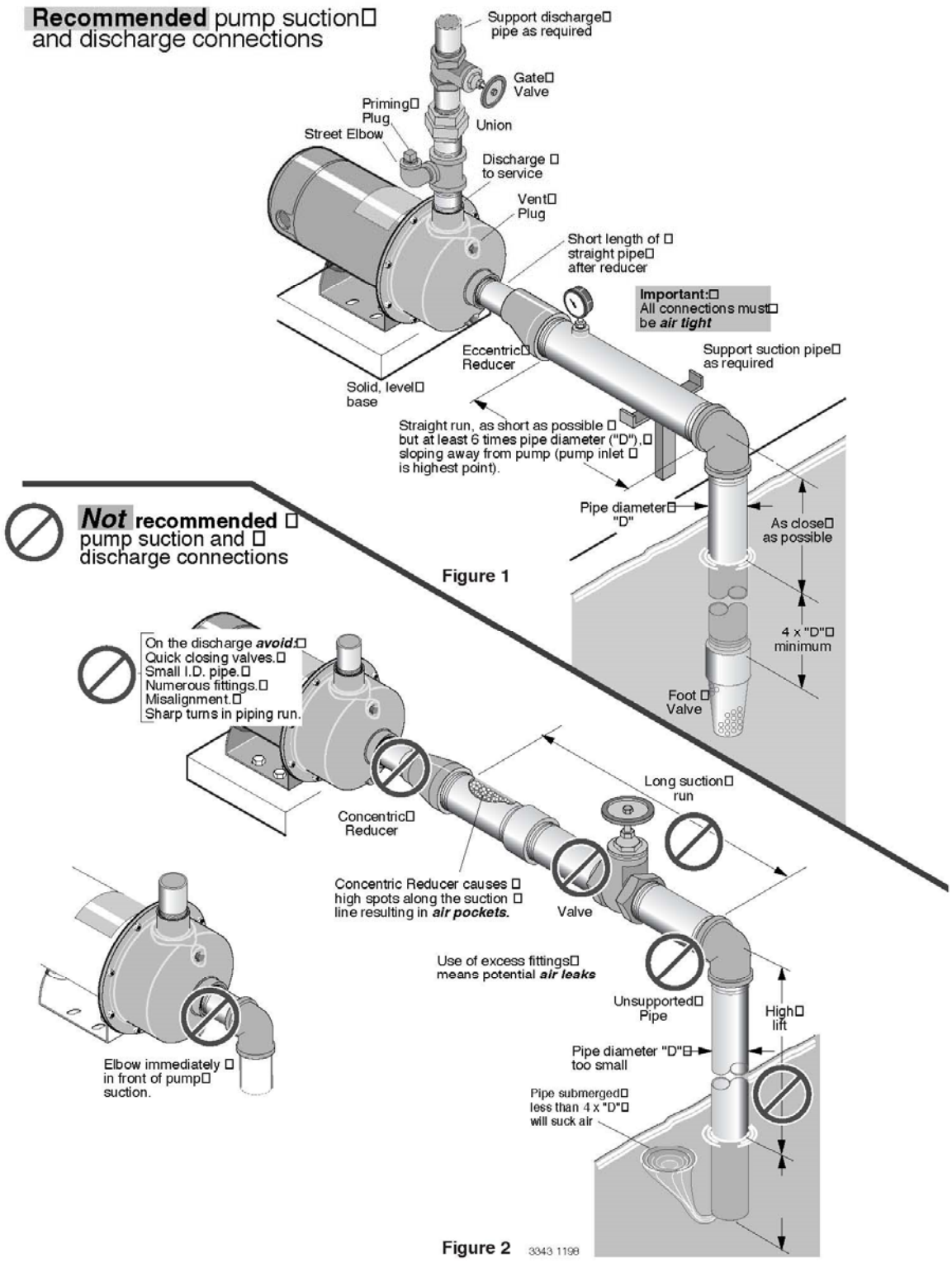


Figure 1

Figure 2 3343 1199

2

PIPING - GENERAL

Support both suction and discharge piping independently at a point near the pump to avoid putting a strain on the pump housing. Start all piping **AT THE PUMP.**

Increase pipe diameter at both the suction and discharge by one (1) standard pipe size (minimum) to obtain desired performance and flow rate. Refer to Table I when sizing pipe for your pumping system.

NOTE: Do not use pipe with **smaller** diameter on the suction side of pump.

TABLE I

Pipe Tapping Size On Pump		Recommended Pipe Size	
Suction	Discharge	Suction	Discharge
1-1/4	1	1-1/2	1-1/4
1-1/2	1-1/4	2	1-1/2

SUCTION PIPE

Increase pipe size from pump tapping as shown in Table I.

Figure 1 (Page 2) depicts a recommended run of pipe and fittings for the suction side of a centrifugal pump. Please refer to this illustration when choosing pipe and fittings for your suction connection.

IMPORTANT: All connections must be air tight!

Figure 2 (Page 2) depicts conditions that are **NOT DESIRABLE** on the suction side of a centrifugal pump and may cause problems in flow rate and priming. Please look this illustration over carefully before choosing pipe and fittings for your suction connection.

DISCHARGE PIPING

Increase pipe size from pump tapping as show in Table I. Figure 1 (Page 2) depicts a recommended run of pipe and fittings for the discharge. Install tee with priming plug as close to pump as possible. Figure 2 (Page 2) notes conditions that should be avoided. Please read over carefully before making discharge connection.

PRIMING THE PUMP

A pump is primed when all air in the suction line and pump volute has been evacuated and replaced with water.

To Prime:

1. Close valve in discharge line.
2. Remove priming plug from tee and fill pump and suction line with water until water is flowing back out of tee.
3. Replace priming plug.
4. Start pump and slowly open valve until desired water flow is achieved.
   NOTE: If no water is pumped after 5 minutes, turn off pump, close valve, and repeat steps 1 thru 4.

⚠ WARNING **Risk of explosion and scalding**. Never run pump against closed discharge. To do so can boil water inside pump, causing hazardous pressure buildup and possible explosion.

⚠ CAUTION **Risk of flooding**. Do not run the pump dry. This will damage mechanical seal and void warranty. It may cause burns to person handling pump.

⚠ CAUTION **Motor normally operates at high temperature and will be too hot to touch.** It is protected from heat damage during operation by an automatic internal cutoff switch. Before handling pump or motor, stop motor and allow it to cool for 20 minutes.

TABLE II - RECOMMENDED FUSING AND WIRING DATA - 60/50 CYCLE MOTORS

MODEL	MOTOR HP	VOLTAGE	MAX. LOAD AMPERES	BRANCH FUSE* RATING AMPS	DISTANCE IN FEET FROM MOTOR TO METER				
					0' TO 100'	101' TO 200'	201' TO 300'	301' TO 400'	401' TO 500'
					WIRE SIZE				
SINGLE PHASE - ODP MOTORS									
SS1XN-½	1/2	115/230/1	8.8/4.4	15/15	14/14	12/14	10/14	8/14	8/12
SS1XN-¾	3/4	115/230/1	12.4/6.2	20/15	12/14	10/14	8/14	6/12	6/12
SS1XS-¾	3/4	115/230/1	14.8/7.4	20/15	12/14	8/14	6/14	6/12	4/10
SS1XN-1	1	115/230/1	14.8/7.4	20/15	12/14	8/14	6/14	6/12	4/10
SS1XS-1	1	115/230/1	19.2/9.6	25/15	10/14	8/14	6/12	4/10	4/10
SS1XN-1½	1-1/2	115/230/1	19.2/9.6	25/15	10/14	8/14	6/12	4/10	4/10
SS1XS-1½	1-1/2	115/230/1	24.0/12.0	30/15	10/14	6/12	6/12	4/10	3/8
SS1¼XN-2	2	115/230/1	24.0/12.0	30/15	10/14	6/12	6/12	4/10	3/8
SS1XS-2	2	115/230/1	26.0/13.0	35/20	8/12	6/12	4/10	4/10	3/8
SS1¼XN-2½	2-1/2	115/230/1	26.0/13.0	35/20	8/12	6/12	4/10	4/10	3/8
SS1XS-2½	2-1/2	115/230/1	26.0/13.0	35/20	8/12	6/12	4/10	4/10	3/8
SINGLE PHASE - TEFC MOTORS									
SS1XN-½	1/2	115/230/1	8.2/4.1	15/15	14/14	12/14	10/14	8/14	8/12
SS1XN-¾	3/4	115/230/1	11.6/5.8	20/15	14/14	10/14	8/14	6/14	6/12
SS1XS-¾	3/4	115/230/1	14.2/17.1	20/15	12/14	12/14	10/14	8/12	8/10
SS1XN-1	1	115/230/1	14.2/17.1	20/15	12/14	12/14	10/14	8/12	8/10
SS1XS-1	1	115/230/1	18.0/9.0	25/15	10/14	8/14	6/12	4/10	4/10
SS1XN-1½	1-1/2	115/230/1	18.0/9.0	25/15	10/14	8/14	6/12	4/10	4/10
SS1XS-1½	1-1/2	115/230/1	11.7	15	14	14	12	10	10
SS1¼XN-2	2	230/1	11.7	15	14	14	12	10	10
SS1XS-2	2	230/1	11.7	15	14	14	12	10	10
SS1¼XN-2½	2-1/2	230/1	11.7	15	14	14	12	10	10
SS1XS-2½	2-1/2	230/1	11.7	15	14	14	12	10	10
THREE PHASE - ODP MOTORS									
SS1XN-½	1/2	230/460/3	2.3/1.15	15	14/14	14/14	14/14	14/14	14/14
SS1XN-¾	3/4	230/460/3	3.1/1.55	15	14/14	14/14	14/14	14/14	14/14
SS1XS-¾	3/4	230/460/3	3.6/1.8	15	14/14	14/14	14/14	14/14	14/14
SS1XN-1	1	230/460/3	3.6/1.8	15	14/14	14/14	14/14	14/14	14/14
SS1XS-1	1	230/460/3	4.7/2.35	15	14/14	14/14	14/14	14/14	14/14
SS1XN-1½	1-1/2	230/460/3	4.7/2.35	15	14/14	14/14	14/14	14/14	14/14
SS1XS-1½	1-1/2	230/460/3	6.8/2.4	15	14/14	14/14	14/14	12/14	12/14
SS1¼XN-2	2	230/460/3	6.8/2.4	15	14/14	14/14	14/14	12/14	12/14
SS1XS-2	2	230/460/3	8.5/4.25	15	14/14	14/14	14/14	12/14	12/14
SS1¼XN-2½	2-1/2	230/460/3	8.5/4.25	15	14/14	14/14	14/14	12/14	12/14
SS1XS-2½	2-1/2	230/460/3	8.5/4.25	15	14/14	14/14	14/14	12/14	12/14
THREE PHASE - TEFC MOTORS									
SS1XN-½	1/2	208-230/460/3	2.2/1.1	15	14/14	14/14	14/14	14/14	14/14
SS1XN-¾	3/4	208-230/460/3	2.9/1.45	15	14/14	14/14	14/14	14/14	14/14
SS1XS-¾	3/4	208-230/460/3	3.6/6.8	15	14/14	14/14	14/14	14/14	14/14
SS1XN-1	1	208-230/460/3	3.6/6.8	15	14/14	14/14	14/14	14/14	14/14
SS1XS-1	1	208-230/460/3	4.8/2.4	15	14/14	14/14	14/14	14/14	14/14
SS1XN-1½	1-1/2	208-230/460/3	4.8/2.4	15	14/14	14/14	14/14	14/14	14/14
SS1XS-1½	1-1/2	208-230/460/3	6.0/3.0	15	14/14	14/14	14/14	14/14	12/14
SS1¼XN-2	2	208-230/460/3	6.0/3.0	15	14/14	14/14	14/14	14/14	12/14
SS1XS-2	2	208-230/460/3	7.0/3.5	15	14/14	14/14	14/14	12/14	12/14
SS1¼XN-2½	2-1/2	208-230/460/3	7.0/3.5	15	14/14	14/14	14/14	12/14	12/14
SS1XS-2½	2-1/2	208-230/460/3	7.0/3.5	15	14/14	14/14	14/14	12/14	12/14

*A Fusetron is recommended instead of a fuse in any motor circuit.

ELECTRICAL

Connection diagram for dual voltage, single-phase motors. Your dual-voltage motor's terminal board (under the motor end cover) will match one of the diagrams below. Follow that diagram if necessary to convert motor to 115 Volt power. Connect power supply wires to L1 and L2.

For 3-phase motors, TEFC motors, and motors that do not match these pictures, follow the connection diagram on the motor nameplate, or in the connection box.

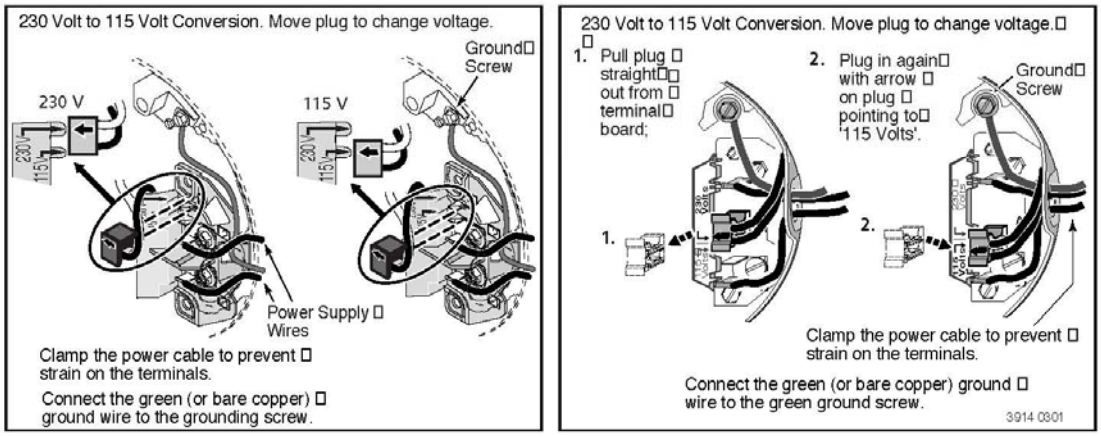


FIGURE 3 – 115/230V Dual Voltage Single Phase Wiring Diagram – ODP Motors

⚠WARNING Hazardous voltage. Can shock, burn, or cause death. Disconnect power to motor before working on pump or motor. Ground motor before connecting to power supply.

WIRING

⚠ **Ground motor before connecting to electrical power supply. Failure to ground motor can cause severe or fatal electrical shock hazard.**

⚠ **Do not ground to a gas supply line.**

⚠ **To avoid dangerous or fatal electrical shock, turn OFF power to motor before working on electrical connections.**

⚠ **Supply voltage must be within ±10% of nameplate voltage. Incorrect voltage can cause fire or damage motor and voids warranty. If in doubt consult a licensed electrician.**

⚠ **Use wire size specified in Wiring Chart (Page 3). If possible, connect pump to a separate branch circuit with no other appliances on it.**

⚠ **Wire motor according to diagram on motor nameplate. If nameplate diagram differs from diagrams above, follow nameplate diagram.**

1. Install, ground, wire and maintain your pump in compliance with the National Electrical Code (NEC) in the U.S., or the Canadian Electrical Code (CEC), as applicable, and with all local codes and ordinances that apply. Consult your local building inspector for code information.
2. Provide a correctly fused disconnect switch for protection while working on motor. For switch requirements, consult your local building inspector for information about codes.
3. Disconnect power before servicing motor or pump. If the disconnect switch is out of sight of pump, lock it open and tag it to prevent unexpected power application.
4. Ground the pump permanently using a wire of the same size as that specified in wiring chart (Page 3). Make ground connection to green grounding terminal under motor canopy marked GRD. or ⏚.
5. Connect ground wire to a grounded lead in the service panel or to a metal underground water pipe or well casing at least 10 feet long. Do not connect to plastic pipe or insulated fittings.
6. Protect current carrying and grounding conductors from cuts, grease, heat, oil, and chemicals.
7. Connect current carrying conductors to terminals L1 and L2 under motor canopy. When replacing motor, check wiring diagram on motor nameplate against Figure 3. If the motor wiring diagram does not match either diagram in Figure 3, follow the diagram on the motor.

IMPORTANT: 115/230 Volt single phase models are shipped from factory with motor wired for 230 volts. If power supply is 115 volts, remove motor canopy and reconnect motor as shown in Figure 3. Do not try to run motor as received on 115 volt current.

8. Motor has automatic internal thermal overload protection. If motor has stopped for unknown reasons, thermal overload may restart it unexpectedly, which could cause injury or property damage. Disconnect power before servicing motor.
9. If this procedure or the wiring diagrams are confusing, consult a licensed electrician.

SERVICE

PUMP SERVICE

This centrifugal pump requires little or no service other than reasonable care and periodic cleaning. Occasionally, however, a shaft seal may become damaged and must be replaced. The procedure as outlined below will enable you to replace the seal.

NOTICE: Pumps use mechanical seals with a rubber seat ring or a sealing O-Ring. THESE SEALS ARE COMPLETELY INTERCHANGEABLE.

NOTICE: The highly polished and lapped faces of this seal are easily damaged. Read instructions and handle the seal with care.

Some models are equipped with an impeller screw, which has a left hand thread. Before unscrewing the impeller, remove the impeller screw.

REMOVAL OF OLD SEAL

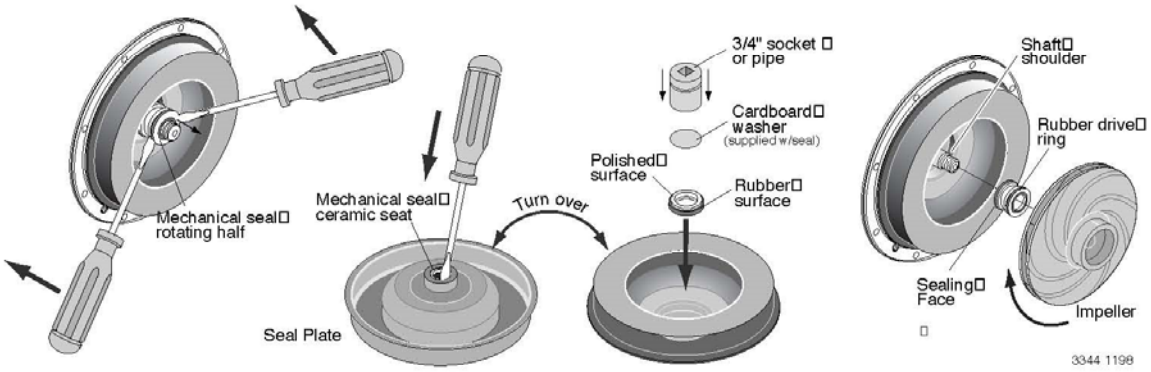
1. After unscrewing impeller, carefully remove rotating part of seal by prying up on sealing washer, using two screwdrivers (see Figure 4A). Use care not to scratch motor shaft.
2. Remove seal plate from motor and place on flat surface, face down. Use a screwdriver to push ceramic seat out from seal cavity (see Figure 4B).

INSTALLATION OF FLOATING SEAT (Figure 4C)

1. Clean polished surface of floating seat with clean cloth.
2. Turn seal plate over so seal cavity is up, clean cavity thoroughly.
3. Lubricate outside rubber surface of ceramic seat with soapy water and press firmly into seal cavity with finger pressure. If seat will not locate properly in this manner, place cardboard washer over polished face of seat and press into seal cavity using a 3/4" socket or 3/4" piece of standard pipe.
4. **DISPOSE OF CARDBOARD WASHER**. Be sure polished surface of seat is free of dirt and has not been damaged by insertion. Remove excess soapy water.

INSTALLATION OF ROTATING PART OF SEAL UNIT (Figure 4D)

1. Reinstall seal plate using extreme caution not to hit ceramic portion of seal on motor shaft.
2. Inspect shaft to make sure that it is clean.
3. Clean face of sealing washer with clean cloth.
4. Lubricate inside diameter and outer face of rubber drive ring with soapy water and slide assembly on motor shaft (sealing face first) until rubber drive ring hits shaft shoulder.
5. Screw impeller onto shaft until impeller hub hits shaft shoulder. This will automatically locate seal in place and move the sealing washer face up against seat facing. Reinstall impeller screw (if used).



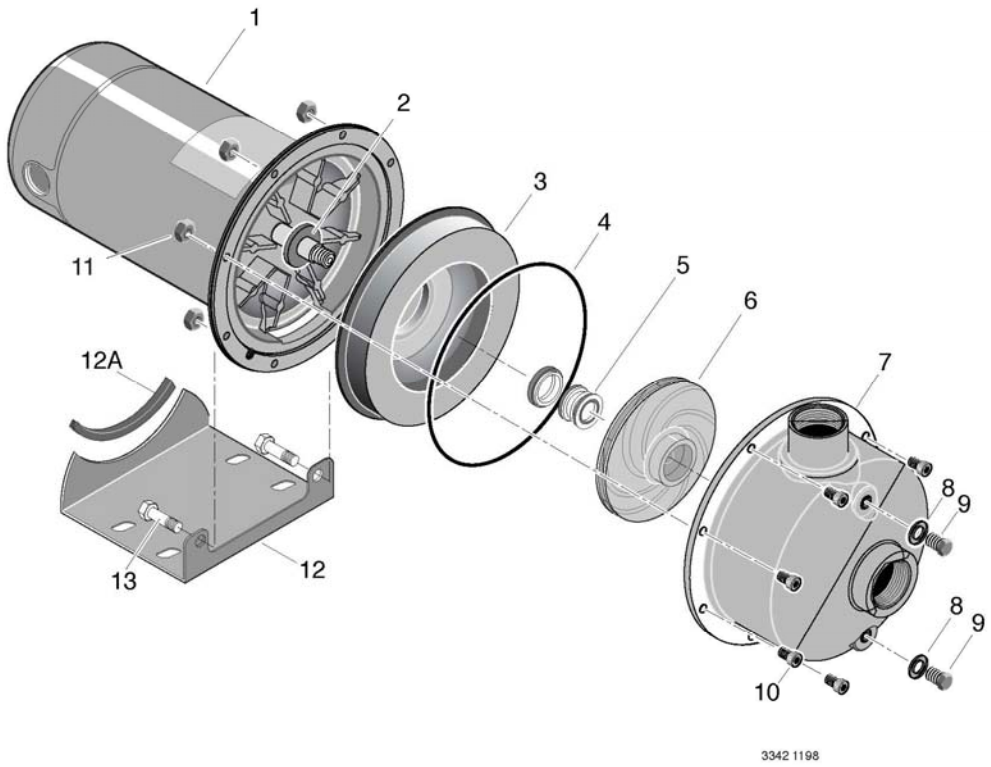
A-Seal removal-rotating half **B**-Seal removal-ceramic seat **C**-Ceramic seat installation **D**-Rotating half installation

FIGURE 4: Seal replacement

TROUBLE - CAUSES AND REMEDY

TROUBLE AND CAUSE	REMEDY
FAILURE TO PUMP	
1. Pump not properly primed.	1. Make sure pump casing and suction line are full of water. See priming instructions.
REDUCED CAPACITY AND/OR HEAD	
1. Air pockets or leaks in suction line.	1. Check suction piping.
2. Clogged impeller.	2. Remove and clean.
PUMP LOSES PRIME	
1. Air leaks in suction line.	1. Check suction piping
2. Excessive suction lift and operating too near shut-off point.	2. Move pump nearer to water level.
3. Water level drops while pumping, uncovering suction piping.	3. Check water supply. Add length of pipe to suction to keep submerged end under water.
MECHANICAL TROUBLES AND NOISE	
1. Bent shaft and/or damaged bearings.	1. Take motor to authorized motor repair shop.
2. Suction and/or discharge piping not properly supported and anchored.	2. See that all piping is supported to relieve strain on pump assembly.

SSCX Series

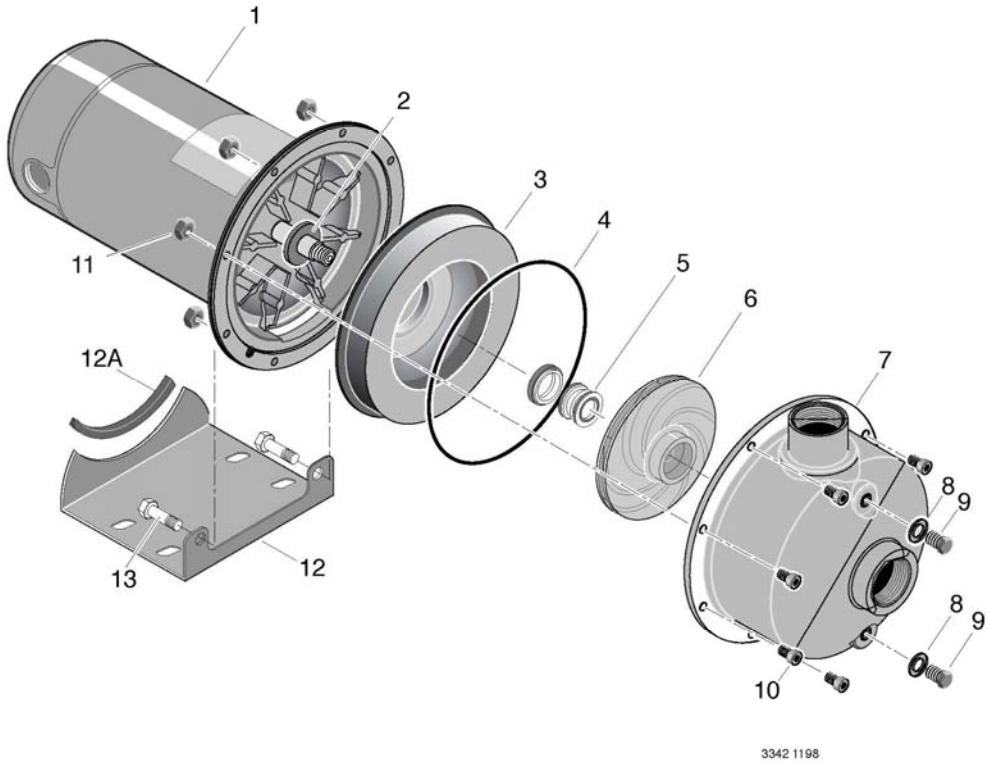


REPAIR PARTS LIST

Key No.	Part Description	No. Used	MOTOR AND HORSEPOWER					
			SS1XN-½	SS1XN-¾	SS1XN-1	SS1XN-1½	SS1¼XN-2	SS1¼XN-2½
			B78635 B78647 B78636 B78648 1/2 HP	B78637 B78649 B78638 B78650 3/4 HP	B78639 B78651 B78640 B78652 1 HP	B78641 B78653 B78642 B78654 1-1/2 HP	B78643 B78655 B78644 B78656 2 HP	B78645 B78646 B78657 B78658 B80427† B80428†† B80429† B80430†† 2-1/2 HP
1*	Motor, 115/230V/60 Hz., 1 Phase, ODP	1	B80440	B80441	B80442	B80443	B80444	B80445
1*	Motor, 115/230V/60 Hz., 1 Phase, TEFC	1	B80452	B80453	B80454	B80455	B80456	B80457
1*	Motor, 208-230/460V/60 Hz., 3 Phase, ODP	1	B80446	B80447	B80448	B80449	B80450	B80451
1*	Motor, 230/460V/60 Hz., 3 Phase, TEFC	1	B80458	B80459	B80460	B80461	B80462	B80463
2	Water Slinger	1	17351-0009	17351-0009	17351-0009	17351-0009	17351-0009	17351-0009
3	Seal Plate	1	C3-200SS	C3-200SS	C3-200SS	C3-200SS	C3-200SS	C3-200SS
4	O-Ring**	1	111P0490	111P0490	111P0490	111P0490	111P0490	111P0490
5	Shaft Seal***	1	U109-6A	U109-6A	U109-6A	U109-6A	U109-6A	U109-6A
6	Impeller - 1 Phase	1	C105-92PNS	C105-92PMS	C105-92PLS	C105-92PBSS	C105-214PCASS	C105-214PASS
6	Impeller - 3 Phase	1	C105-92PNSA	C105-92PMSA	C105-92PLSA	C105-92PBSSA	C105-214PCASS	C105-214PASS
•	Impeller Screw - 1 Phase	1	–	–	–	–	C30-14SS	C30-14SS
•	Impeller Screw - 3 Phase	1	C30-14SS	C30-14SS	C30-14SS	C30-14SS	C30-14SS	C30-14SS
7	Casing/Diffuser Assembly	1	723S2990	723S2990	723S2990	723S2990	C101-286SS	C101-286SS
8	Washer	2	111P0990	111P0990	111P0990	111P0990	111P0990	111P0990
9	Stainless Steel Plug	2	121P2100	121P2100	121P2100	121P2100	121P2100	121P2100
10	Screw	8	121P0310	121P0310	121P0310	121P0310	121P0310	121P0310
11	Nut, M6x1	8	U36-207SS	U36-207SS	U36-207SS	U36-207SS	U36-207SS	U36-207SS
12	Base	1	J104-9F	J104-9F	J104-9F	J104-9F	J104-9F	J104-9F
12	Base (1 Phase, TEFC only)	1	J104-9A	J104-9A	J104-9A	J104-9A	J104-9A	J104-9A
12A	Motor Pad	1	C35-5	C35-5	C35-5	C35-5	C35-5	C35-5
13	Capscrews, 3/8-16x3/4"	2	U30-72SS	U30-72SS	U30-72SS	U30-72SS	U30-72SS	U30-72SS

* For repair or service to motors, always give the motor Model Number and any other data found on the Motor Model Plate.
** Models B80427, B80428, B80429 and B80430 use Part Number U9-434.
*** Models B80427 and B80428 use Shaft Seal Number U109-432SS.
Models B80429 and B80430 use Shaft Seal Number U9-437.
† These models use Motor Number B80445.
†† These models use Motor Number B80451.
• Not illustrated.

SSCXS Series



REPAIR PARTS LIST

Key No.	Part Description	No. Used	MOTOR AND HORSEPOWER				
			SS1XS-¾	SS1XS-1	SS1XS-1½	SS1XS-2	SS1XS-2½
			B82414 B82413 B82412 B82411 3/4 HP	B82418 B82417 B82416 B82415 1 HP	B82422 B82421 B82420 B82419 1-1/2 HP	B82426 B82425 B82424 B82423 2 HP	B82430 B82429 B82428 B82427 2-1/2 HP
1	Motor, 115/230V/60 Hz., 1 Phase, ODP	1	B80442	B80443	B80444	B80445	B80445
1	Motor, 115/230V/60 Hz., 1 Phase, TEFC	1	B80454	B80455	B80456	B80447	B80447
1	Motor, 208-230/460V/60 Hz., 3 Phase, ODP	1	B80448	B80449	B80450	B80451	B80451
1	Motor, 230/460V/60 Hz., 3 Phase, TEFC	1	B80460	B80461	B80462	B80463	B80463
2	Water Slinger	1	17351-0009	17351-0009	17351-0009	17351-0009	17351-0009
3	Seal Plate	1	C3-200SS	C3-200SS	C3-200SS	C3-200SS	C3-200SS
4	O-Ring	1	U9-434	U9-434	U9-434	U9-434	U9-434
5	Shaft Seal*	1	U109-196A	U109-196A	U109-196A	U109-196A	U109-196A
6	Impeller	1	731S6230	731S6220	731S6210	731S6200	731S6190
•	Impeller Screw - 1 Phase	1	–	–	–	C30-14SS	C30-14SS
•	Impeller Screw - 3 Phase	1	C30-14SS	C30-14SS	C30-14SS	C30-14SS	C30-14SS
7	Casing/Diffuser Assembly	1	723S2990	723S2990	723S2990	723S2990	723S2990
8	Washer	2	111P0990	111P0990	111P0990	111P0990	111P0990
9	Stainless Steel Plug	2	121P2100	121P2100	121P2100	121P2100	121P2100
10	Screw	8	121P0310	121P0310	121P0310	121P0310	121P0310
11	Nut, M6x1	8	U36-207SS	U36-207SS	U36-207SS	U36-207SS	U36-207SS
12	Base	1	J104-9F	J104-9F	J104-9F	J104-9F	J104-9F
12	Base (1 Phase, TEFC only)	1	J104-9A	J104-9A	J104-9A	J104-9A	J104-9A
12A	Motor Pad	1	C35-5	C35-5	C35-5	C35-5	C35-5
13	Capscrews, 3/8-16x3/4"	2	U30-72SS	U30-72SS	U30-72SS	U30-72SS	U30-72SS

* Models B82413, B82414, B82417, B82418, B82421, B82422, B82425, B82426, B82429, B82430 use Part Number U9-437.
• Not illustrated.

BERKELEY LIMITED WARRANTY

Berkeley/Wicor Canada Company ("Wicor") warrants to the original consumer purchaser ("Purchaser") of its products that they are free from defects in material or workmanship.

If within twelve (12) months from the date of installation or twenty-four (24) months from the date of manufacture any such product shall prove to be defective, it shall be repaired or replaced at Berkeley's/Wicor's option, subject to the terms and conditions set forth below.

General Terms and Conditions

Purchaser must pay all labor and shipping charges necessary to replace product covered by this warranty. This warranty shall not apply to products which, in the sole judgement of Berkeley/Wicor, have been subject to negligence, abuse, accident, misapplication, tampering, alteration; nor due to improper installation, operation, maintenance or storage; nor to other than normal application, use or service, including but not limited to, operational failures caused by corrosion, rust or other foreign materials in the system, or operation at pressures in excess of recommended maximums.

Requests for service under this warranty shall be made by contacting the installing Berkeley/Wicor dealer as soon as possible after the discovery of any alleged defect. Berkeley/Wicor will subsequently take corrective action as promptly as reasonably possible. No requests for service under this warranty will be accepted if received more than 30 days after the term of the warranty.

The warranty on all three phase submersible motors is void if three-leg overload protection of recommended size is not used.

This warranty sets forth Berkeley's/Wicor's sole obligation and purchaser's exclusive remedy for defective products.

BERKELEY/WICOR SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, OR CONTINGENT DAMAGES WHATSOEVER.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS WARRANTIES. IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL NOT EXTEND BEYOND THE DURATION OF THE APPLICABLE EXPRESS WARRANTIES PROVIDED HEREIN.

Some states do not allow the exclusion or limitation of incidental or consequential damages or limitations on how long an implied warranty lasts, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

In the U.S.: Berkeley, 293 Wright St., Delavan, WI 53115

In Canada: Wicor Canada Company, 1800 Courtney Park Drive East, Unit 5-7, Mississauga, Ontario L5T 1W1

Auto Backwash Timer

OMRON®

Solid-State Repeat-Cycle Timer | H3CR-F

1/16 DIN Solid-State Repeat-Cycle Timer

- Wide power supply ranges of 100 to 240 VAC 24 VAC/VDC, 12VDC
- Combinations of independent long or short ON/OFF time settings are possible
- Fourteen time ranges from 0.05 s to 30 h or 1.2 s to 300 h
- Repeat cycle models with either ON start or OFF start operating functions
- Easy sequence checks through instantaneous outputs for a zero set value at any time range
- 11-pin and 8-pin models are available

Ordering Information

Part number					
	Repeat cycle OFF start	H3CR-F	H3CR-F8	H3CR-F-300	H3CR-F8-300
	Repeat cycle ON start	H3CR-FN	H3CR-F8N	H3CR-FN-300	H3CR-F8N-300
Timing units		0.05 s to 30 h		1.2 s to 300 h	
Terminal form		11-pin models	8-pin models	11-pin models	8-pin models
Supply voltages		100 to 240 VAC, 24 VAC/DC, 12 VDC			
Operating mode		Repeat cycle			

Note: Specify both the model number and supply voltage when ordering.
Example: H3CR-F 24 VAC/DC
Supply voltage

■ MODEL NUMBER LEGEND

H3CR - □ □ □ - □
1 2 3 4

1. Classification
F: Repeat cycle timers

2. Configuration
None: 11-pin socket
8: 8-pin socket

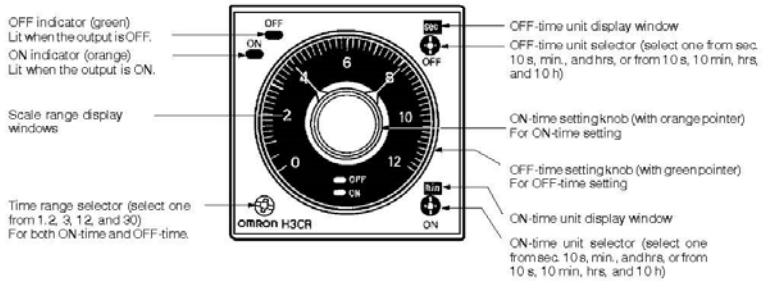
3. Repeat cycle mode
None: OFF start
N: ON start

4. Specified Type
300: Long time range (1.2 s to 300 h) type

■ ACCESSORIES

Description			Part number
Sockets	11-pin	Bottom surface or track mounting, top screw terminals	P2CF-11
		Bottom surface or track mounting, top screw terminals, finger-safe terminal conforms to VDE0106/P100	P2CF-11-E
		Back mounting, for use with Y92F-30 mounting adapter, bottom screw terminals	P3GA-11
	8-pin	Bottom surface or track mounting, top screw terminals	P2CF-08
		Bottom surface or track mounting, top screw terminals, finger-safe terminal conforms to VDE0106/P100	P2CF-08-E
		Back mounting, for use with Y92F-30 mounting adapter, bottom screw terminals	P3G-08
		Terminal cover for P3G sockets, conforms to VDE0106/P100	Y92A-486
Panel mounting adapter		Fits behind panel, ideal for side-by-side installation. Use P3G_-_ sockets	Y92F-30
		Panel-mounting adapter (88 mm x 58 mm x 66 mm)	Y92F-73
		Panel-mounting adapter (58 mm x 50 mm x 66 mm)	Y92F-74
Protective cover		Hard plastic cover protects against dust, dirt and water; not for use with panel covers	Y92A-48B
NEMA 4 cover		Waterproof front cover	Y92A-48N
Colored panel covers		Light gray (Munsell No. 5Y7/1) to match case	Y92P-48GL
		Medium gray (Munsell No. 5Y5/1)	Y92P-48GM
		Black (Munsell No. N1.5)	Y92P-48GB
Mounting track		DIN rail, 50 cm (1.64 ft) length; 7.3 mm thick	PFP-50N
		DIN rail, 1 m (3.28 ft) length; 7.3 mm thick	PFP-100N
		DIN rail, 1 m (3.28 ft) length; 16 mm thick	PFP-100N2
End plate			PFP-M
Spacer			PFP-S

■ RANGE SELECTION



0.05 s to 30 h Models

Time range	Time units			
	s (sec)	x 10 s (10 s)	min	h (hrs)
1.2	0.05 to 1.2	1.2 to 12	0.12 to 1.2	
3	0.3 to 3	3 to 30	0.3 to 3	
12	1.2 to 12	12 to 120	1.2 to 12	
30	3 to 30	30 to 300	3 to 30	

Note: Instantaneous output is available at any time range. To obtain instantaneous output, set to below 0.

1.2 s to 300 h Models

Time range	Time units			
	x 10 s (10 s)	x 10 min (10 min)	h (hrs)	x 10 h (10 h)
1.2	1.2 to 12	1.2 to 12	0.12 to 1.2	1.2 to 12
3	3 to 30	3 to 30	0.3 to 3	3 to 30
12	12 to 120	12 to 120	1.2 to 12	12 to 120
30	30 to 300	30 to 300	3 to 30	30 to 300

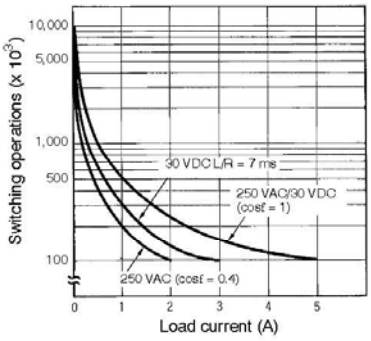
Note: Instantaneous output is available at any time range. To obtain instantaneous output, set to below 0.

Specifications

Part number		H3CR-F/-F-300	H3CR-F8/-F8-300	H3CR-FN/-FN-300	H3CR-F8N/-F8N-300
Operating mode		OFF start		ON start	
Supply voltage (see note)	AC	100 to 240 VAC (50/60 Hz)			
	AC/DC	24 VAC/DC (50/60 Hz)			
	DC	12 VDC			
Operating voltage range		85% to 110% of rated supply voltage, 90% to 110% with 12-VDC models			
Power consumption	AC	100 to 240 VAC: 10 VA (100 VAC applied)			
	AC/DC	24 VAC/DC: 2 VA (24 VAC applied)/1 W (24 VDC applied)			
	DC	12 VDC: 1 W			
Start, Reset, Gate inputs		ON-impedance: 1 kΩ max. ON residual voltage: 1 V max OFF impedance: 500 kΩ min.			
Control outputs	Type	DPDT relay			
	Max. load	5 A at 250 VAC, p.f. = 1			
	Min. load	10mA at 5 VDC			
Repeat accuracy		±0.3% full scale max. (±0.3% full scale max. ±10 ms in ranges of 1.2 and 3 s)			
Setting error		±5% full scale max ±0.05 s max.			
Resetting system		Time-limit operation/time-limit reset or self-reset			
Resetting time		Minimum power-opening time: 0.1 sec			
Indicators		Output ON indicator (orange LED), output OFF indicator (green LED)			
Materials		Plastic case (light gray Munsell 5Y7/1)			
Mounting		Panel, DIN track, or surface depending on socket selected			
Connections		11-pin round socket	8-pin round socket	11-pin round socket	8-pin round socket
Weight		Approx. 100 g (4.23 oz.)			
Approvals		UL, CSA, CE			
Ambient temperature	Operating	-10° to 55°C (14° to 131°F) with no icing			
	Storage	-25° to 65°C (-13° to 149°F) with no icing			
Humidity		35% to 85%			
Vibration	Mechanical durability	10 to 55 Hz with 0.75-mm single amplitude each in three directions			
	Malfunction durability	10 to 55 Hz with 0.5-mm single amplitude each in three directions			
Shock	Mechanical durability	980 m/s^2 (100G) each in three directions			
	Malfunction durability	98 m/s^2 (10G) each in three directions			
Variation due to voltage change		±0.5% full scale max. (±0.5% full scale max. ±10 ms in ranges of 1.2 and 3 s)			
Variation due to temperature change		±2% full scale max. (±2% full scale max. ±l0 ms in ranges of 1.2 and 3 s)			
Service life	Mechanical	20 million operations min. (under no load at 1,800 operations/h)			
	Electrical	100,000 operations min. (5 A at 250 VAC, resistive load at 1,800 operations/h)			
Insulation resistance		100 MΩ min. (at 500 VDC)			

Note: A power supply with a ripple of 20% max. (single-phase power supply with full-wave rectification) can be used with each DC model.

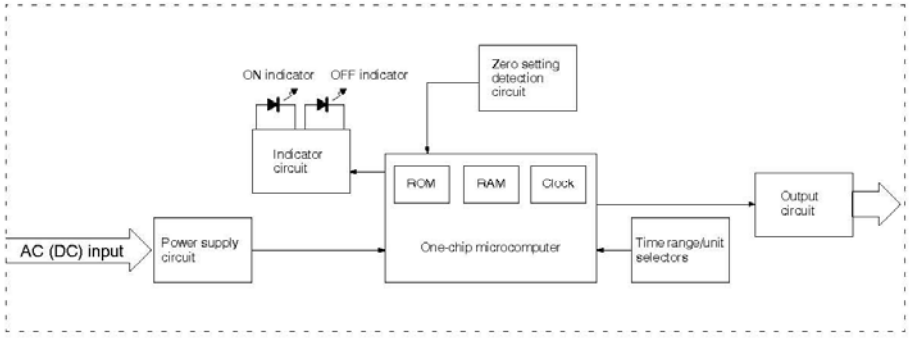
Engineering Data



Note: A maximum current of 0.15 A can be switched at 125 VDC (cosf = 1) and a maximum current of 0.1 A can be switched if L/R is 7 ms. In both cases, a life of 100,000 operations can be expected.
The minimum applicable load is 10 mA at 5 VDC (failure level: P).

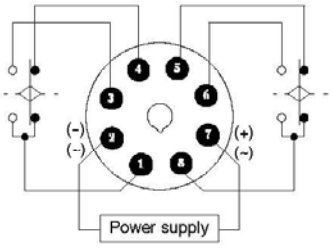
Operation

■ BLOCK DIAGRAMS

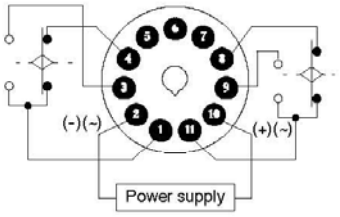


Timing Charts

H3CR-F8
H3CR-F8N
H3CR-F8-300
H3CR-F8N-300

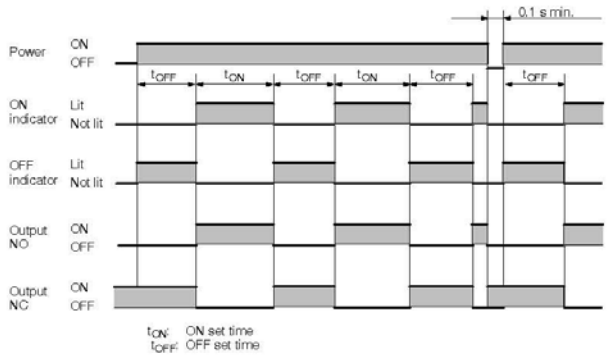
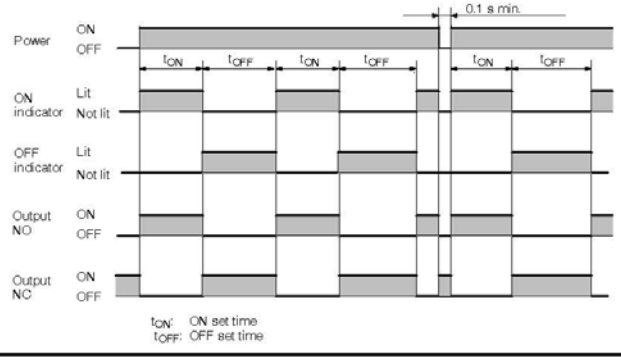


H3CR-F
H3CR-FN
H3CR-F-300
H3CR-FN-300



Note: Leave terminals 5, 6, and 7 open.
Do not use them as relay terminals.

Note: Part numbers with an "N" included are Repeat cycle ON start timers. All others are Repeat cycle OFF start timers.

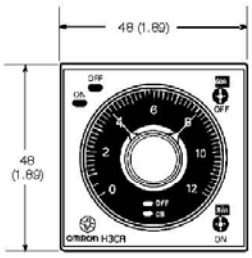
Operating mode	Timing chart
Repeat cycle OFF start	
Repeat cycle ON start	

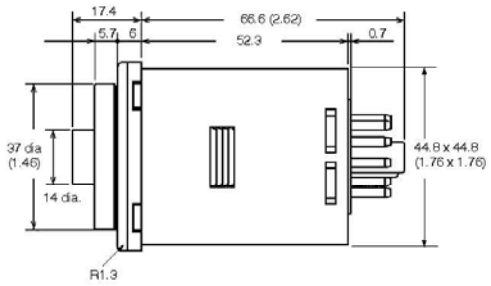
Dimensions

■ TIMERS

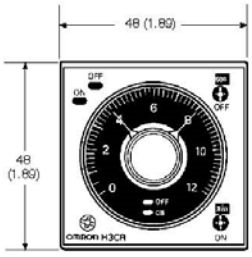
Unit: mm (inch)

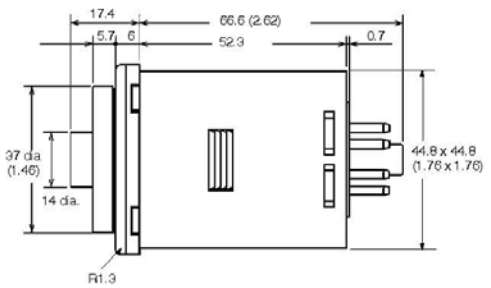
H3CR-F
H3CR-FN
H3CR-F-300
H3CR-FN-300





H3CR-F8
H3CR-F8N
H3CR-F8-300
H3CR-F8N-300

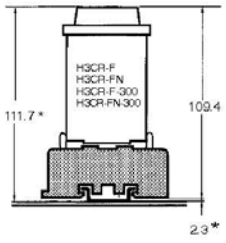




■ TRACK MOUNTING

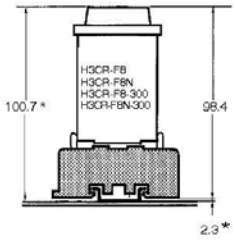
11-Pin Models

P2CF-11/P2CF-11-E



8-Pin Models

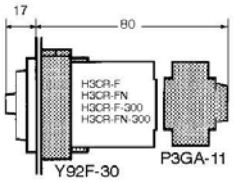
P2CF-08/P2CF-08-E



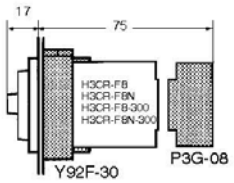
* These dimensions vary with the kind of DIN track (reference value).

■ PANEL MOUNTING

11-Pin Models



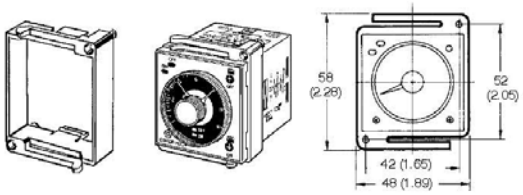
8-Pin Models

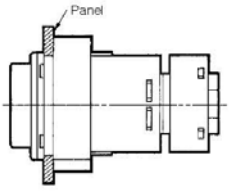


■ PANEL-MOUNTING ADAPTERS

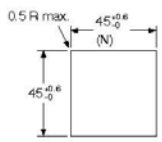
Unit: mm (inch)

Y92F-30





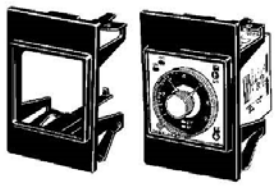
Panel Cutout

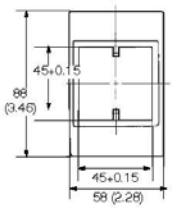


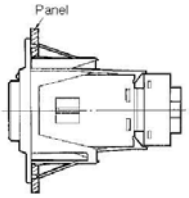
Note: Recommended panel thickness is 1 to 3.2 mm.

Note: Adapter installs behind the panel. It is ideal for side by side installation. Use P3G-11 or P3G-08 sockets.

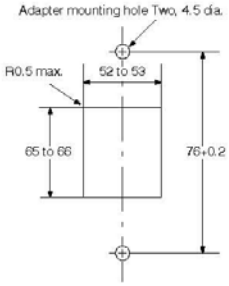
Y92F-73





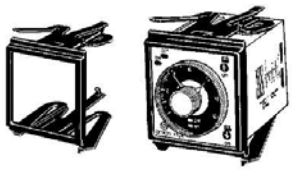


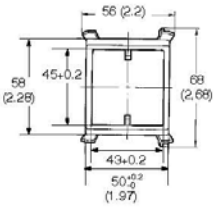
Panel Cutout

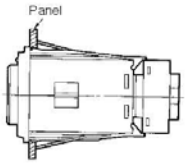


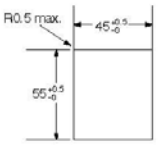
Note: The mounting panel thickness should be 1 to 3.2 mm.

Y92F-74







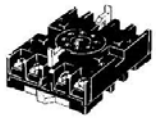


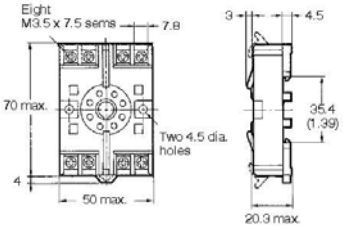
Note: The mounting panel thickness should be 1 to 3.2 mm.

■ SOCKETS

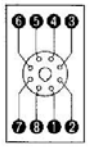
Track-Mounting/Front-Connecting Socket

P2CF-08

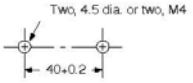




Terminal Arrangement/ Internal Connections (Top View)

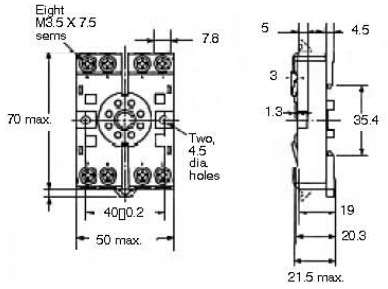


Surface Mounting Holes

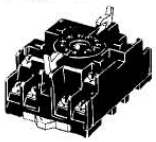


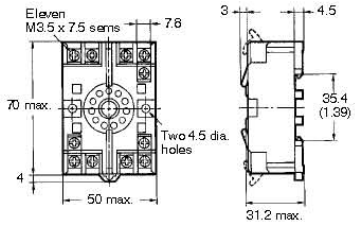
P2CF-08-E (Finger-Safe Terminal Type)

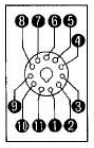
Conforming to VDE0106/P100

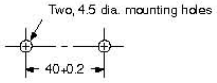


P2CF-11



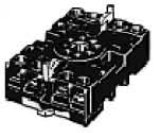


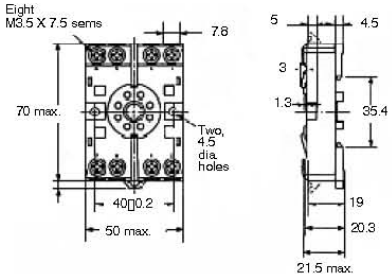




P2CF-08-E (Finger-Safe Terminal Type)

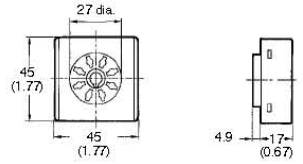
Conforming to VDE0106/P100





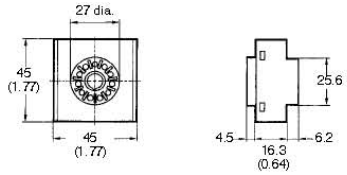
Back-Mounting Socket

P3G-08



Terminal Arrangement/ Internal Connections (Bottom View)

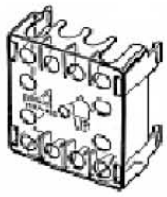
P3GA-11

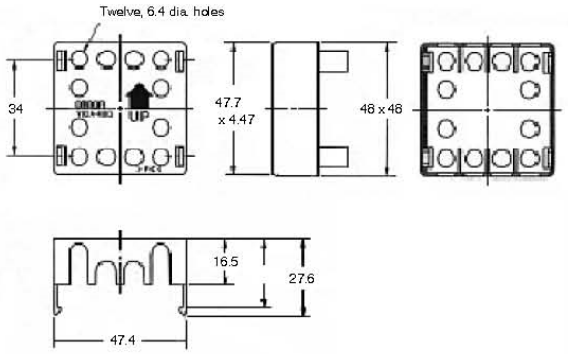


Finger-Safe Terminal Cover for P3G(A)

Conforming to VDE0106/P100

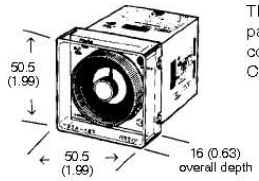
Y92A-48G





■ PROTECTIVE COVER

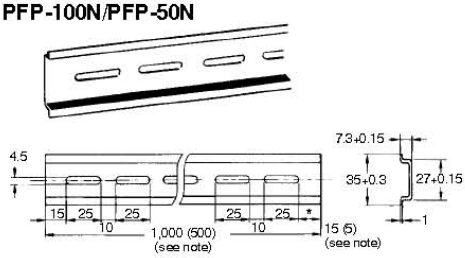
Y92A-48B



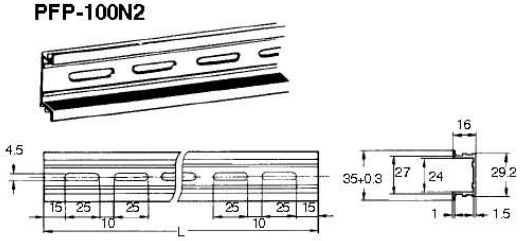
The hard plastic protective cover prevents accidental resetting. It also shields the front panel from dirt and water. The cover is intended for use in areas where unusual service conditions do not exist. The Y92A-48B cover cannot be used with the Y92P Panel Covers below.

■ MOUNTING TRACK AND ACCESSORIES

PFP-100N/PFP-50N

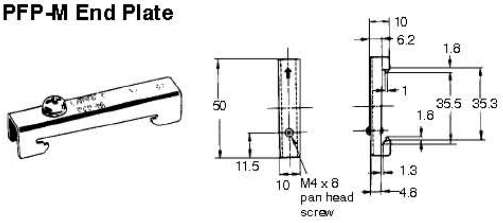


PFP-100N2

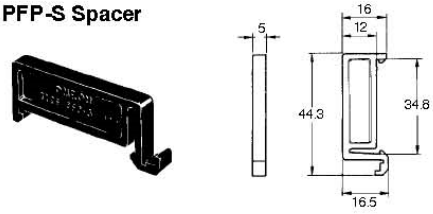


Note: The values shown in parentheses are for the PFP-50N.

PFP-M End Plate



PFP-S Spacer



System Warranty

ULTRASORB® System
Limited Warranty

This warranty supersedes and replaces any warranty statements orally made by the Sales Person, Distributor, or Dealer or contained in written instructions or other Brochures or informational documents in relation to this product.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF

The Manufacturer Warrants, parts only for a period of twelve (12) months from the time of startup, not to exceed fourteen (14) months from the date of shipment, the new **ULTRASORB®** System to be free from defects in material and workmanship under the normal use and service when operated and maintained in strict accordance with the **ULTRASORB®** System operating instructions.

The Manufacturer's obligations under this warranty is being limited to repairing or replacing any part found to its satisfaction to be so defective, provided that such part is, upon request, returned to the Distributor or Manufacturer, with freight prepaid. This warranty does not cover parts damaged by decomposition from chemical action or wear caused by abrasive materials, nor does it cover damage resulting from misuse, abuse, or any other than its intended use, accident, neglect, or from improper operation, maintenance, installation, modification or adjustments.

This warranty does not cover parts or equipment used with the **ULTRASORB®** System that are not made by the manufacturer, since these items are covered by warranties from the respective manufacturer. The Manufacturer makes no warranty as to electrical apparatus or other materials not of its manufacturer.

The Manufacturer's sole responsibility shall be limited to repair or replacement of the equipment within the terms stated herein above.

The Manufacturer shall not be liable for consequential or punitive damages whether or not caused by manufacturer's negligence or resulting from any expressed or implied warranty or breach thereof. Consequential damages for the purpose of this agreement shall include, but are not limited to, the loss of use, income or profit, or loss of or damage to property occasioned by or arising out of in-operation, use, the operation, installation, repair, or replacement of the equipment or otherwise.

It is understood that any controversy or claim arising out of or relating to the **ULTRASORB® System Warranty** herein or the alleged breach thereof, shall be settled by arbitration in accordance with the rules of the Arbitration Association of America, Palm Beach County, Florida, and judgment upon the award rendered by the arbitrator(s) may be entered in any court baring jurisdiction thereof.

PROCESS PERFORMANCE WARRANTY

The Manufacturer Warrants that when installed and operated in accordance with the Manufacturer's written instructions, the **ULTRASORB®** System will remove dirt, oil, and grease from wash water. No other warranty expressed or implied should be considered valid. There are numerous operating conditions which will affect the efficiency of the **ULTRASORB®** System, thereby making any general water quality statement unrealistic.

WARRANTY SERVICE

In order to validate your warranty, fill out the **Warranty Validation Form** and return to ***RGF*** at the address below:

RGF WARRANTY DEPARTMENT
Outside of Florida (800) - 842 - 7771
In Florida (561) - 848 - 1826
or FAX (561) - 848 - 9454

To obtain warranty service contact ***RGF*** and a warranty representative will help with the warranty problem and determine the status and a **Warranty Authorization Number** will be given at that time. Be prepared to answer specific questions on the problem at hand. If there are warranted parts that need to be returned, fill in the **Warranty Authorization Number on the Warranty Request Form** along with the items being submitted for warranty and an brief explanation of the problem or defect and return it and the part(s) to:

RGF Environmental Group, Inc.
c/o Warranty Department
3875 Fiscal Court
West Palm Beach, Florida 33404

ULTRASORB® System
Limited Warranty Policy

RGF ENVIRONMENTAL GROUP, INC. ["Manufacturer"] Warrants the **ULTRASORB® System** to be free from DEFECTS in Material and Workmanship.

HOW LONG IS THE WARRANTY?

- For twelve (12) months from the date of initial startup of the system; not to exceed fourteen (14) months from the date of delivery.
- The Installation / Startup Record and Warranty Registration Form should be signed and dated by an authorized officer or employee of the customer and returned to RGF promptly to activate the warranty.

HOW DO I CONTACT RGF ENVIRONMENTAL GROUP ABOUT MY WARRANTY, A QUESTION, OR A COMPLAINT?

- A question or a complaint mat be addressed directly by your local Distributor or dealer.
- If they cannot answer the question or complaint directly, then call or FAX the Warranty Department at RGF at:

RGF WARRANTY DEPARTMENT
Outside of Florida (800) - 842 - 7771
In Florida (561) - 848 - 1826
FAX (561) - 848 - 9454

ARE THERE ANY PARTS THAT ARE NOT COVERED BY THIS WARRANTY? (That the Manufacturer will not repair or replace)

- Parts that are damaged by decomposition from chemical action or wear caused by abrasive materials, nor does it cover damage resulting from misuse, abuse, any other than it's intended use, accident, neglect, or from improper operation, maintenance, installation modification or adjustments.
- Parts not made by the Manufacturer, such as the electric pressure pump motor or other materials not of it's manufacturer. However, RGF will process the claim with the pump or other manufacturer.

WHAT SHOULD BE DONE IN THE EVENT THAT THE EQUIPMENT IS DAMAGED BY SHIPPING?

- Immediately upon receipt of the system, the purchaser is responsible to take the shipping containers off of the truck and inspect the equipment and parts for damage.

- If there is any visible damage to the equipment:
  1. Notify the driver of the courier company immediately and write on the Bill of Lading what is damaged or missing.
  2. Call **RGF** immediately at **1 - (800) - 842 - 7771** outside of Florida, **1 - (561) - 848- 1826** in Florida, or **FAX 1- (561) - 848 - 9454.**

WHAT IF DAMAGE IS FOUND ON THE EQUIPMENT AFTER THE COURIER HAS LEFT?

- Claims for concealed shipping damage must be reported to the courier and a copy sent to RGF in writing via **FAX 1 - (561) 848 - 9454** or certified U.S. mail within fifteen (15) days from the date of delivery.

  NOTE:
  The courier company will not cover the damages if the foregoing steps are not adhered to.

STEPS THAT SHOULD BE TAKEN IF WARRANTY WORK OR REPLACEMENT IS NEEDED.

- Call your local distributor or RGF Warranty Department and notify them of the problem or malfunction. Be prepared to be very descriptive with the problem.

- If it is determined that a part has malfunctioned due to defect, a **Warranty Authorization Number** will be given for tracking the part. Fill out the **Warranty Request Form** along with the Warranty Authorization number and return it along with the defective part prepaid to:

  RGF Environmental Group, Inc.
  c/o Warranty Department
  3875 Fiscal Court
  West Palm Beach, Florida 33404

THINGS THAT SHOULD BE DONE TO HELP KEEP THE ULTRASORB SYSTEM RUNNING EFFICIENTLY.

- Read the Operations Manual thoroughly.
- Make sure all of the employees who operate the system are fully trained on the procedures for operating the system and follow preventive maintenance routines strictly.

- Do not run water that has contaminants through the system that it is not designed to remove.

- Make sure the system is operated in accordance with the Manufacturer's suggested instructions.

- Replace filters as recommended in the Operations Manual.

- Control the water quality in accordance with RGF's suggested guidelines.

- Keep sump pits, trenches, and weirs cleared of heavy sediment build up. Heavy solids build up will cause the sump pump to overheat and fail to operate properly. Failure to prevent this will void the sump pumps warranty.

- Lack of a water clarifier (such as hydrogen peroxide, chlorine, WC-1, Ozone, etc.) will cause algae to grow resulting in plugged filters and foul smell.

WHAT SERVICE IS EXPECTED FROM THE DISTRIBUTOR?

- The Distributor will install, perform the initial startup, and train your personnel.

Should there be any questions relating to this warranty policy information, please feel free to contact our customer service representative at:

RGF Customer Service	
Outside of Florida	**(800) - 842 - 7771**
In Florida	**(561) - 848 - 1826**
FAX	**(561) - 848 - 9454**
or Write	**RGF Environmental Group, Inc.** **c/o Customer Service Dept.** **3875 Fiscal Ct.** **West Palm Beach, FL 33404**

Product Registration and Return Forms

ULTRASORB® System
Warranty Request Form

NOTE: THIS FORM MUST BE COMPLETED AND ACCOMPANY ALL RETURNED ITEMS

Warranty Authorization Number: W-_____

CUSTOMER:
NAME _____
ADDRESS _____
_____
PHONE _____ FAX _____

DISTRIBUTOR:
NAME _____
ADDRESS _____
_____
CONTACT _____

UNIT:
MODEL _____
SERIAL # _____
DATE OF PURCHASE _____

ITEMS BEING SUBMITTED FOR WARRANTY:

PLEASE LIST THE PARTS AND GIVE A BRIEF DESCRIPTION OF THE PROBLEM.

ITEMS
1) _____
2) _____

DESCRIPTION (COMMENTS)
1) _____
2) _____
3) _____

SHIP TO: ***RGF ENVIRONMENTAL GROUP, INC.***
c/o WARRANTY DEPTMENT
3875 FISCAL COURT
WEST PALM BEACH, FLORIDA 33404
FAX 561-848-9454

(FOR *RGF* USE ONLY)
DATE ITEMS RECV'D _____
RECEIVED BY _____
REPLACEMENT PART SENT/WARRANTY APPROVED ☐ WARRANTY DENIED ☐

ULTRASORB® System
Warranty Validation Form

To validate the Warranty for the system, this form must be read, signed and returned to:

RGF Environmental Group, Inc.
c/o Warranty Department
3875 Fiscal Court
West Palm Beach, Florida 33404
FAX 561-848-9454

1. I have inspected the system upon arrival for shipping damage and have reported any problems to the local distributor, the courier company, or *RGF* within the required time period.

2. I have been provided with training on the operation and procedures for the system by the distributor or *RGF* representative, during the installation and startup of the system.

3. I understand it is the customer's responsibility to:

- Regularly monitor and maintain the water chemistry of the system and to utilize properly only any chemicals or cleaning agents that are compatible with the equipment.
- To regularly clean out the sump pit and perform suggested preventive maintenance on the system in order to keep the system in good working order. I understand that failing to do so will adversely effect the efficiency of the system. I also understand, that it is my responsibility to properly dispose of the used filters, pit sediment, and any other by-products accordingly.
- Protect the system from extreme (high/low) temperatures to prevent damage to the components and piping of the system.
- Notify the local distributor or *RGF* Warranty Dept. immediately upon any malfunction of the system in order to receive warranted work or parts.

4. I understand that any controversy or claim arising out of or relating to the **ULTRASORB® System Warranty** herein or the alleged breach thereof, shall be settled by arbitration in accordance with the rules of the Arbitration Association of America, Palm Beach County, Florida, and judgment upon the award rendered by the arbitrator(s) may be entered in any court baring jurisdiction thereof.

I hereby acknowledge the above.

Customers Name _____
Address _____
_____

Signature _____ **Date** _____

ULTRASORB® System
Installation / Startup Record

Model Number _____ **Installation Date** _____

Serial Number _____ **Start-Up Tech.** _____

Distributer _____

Customer _____

Address _____

_____

Phone (___)_____**FAX ( )**_____**Contact**_____

Names of Trainees	Position	Initials

What is Being Cleaned_____**Hr's. Per Day**_____

Washpad Design & Const. By?_____

Is the Washpad Satisfactory? Yes ___ No ___ If No, Explain_____

_____

_____

Was the Unit Missing Parts? Yes ___ No ___ If Yes, Explain_____

_____

_____

Did the Unit Have Shipping or Hidden Damage? Yes ___ No ___ If Yes, Explain_____

_____

_____

List Any Options/Modifications with this Unit._____

_____

_____

ULTRASORB® System
Installation / Startup Checklist

MAINTENANCE PROCEDURES, CHECK IF COVERED & APPLICABLE

_____ **Overall System Description**
_____ **EPA & Sewer Rules**
_____ **Wash Pad Maintenance**
_____ **Solids Cleaning Procedure**
_____ **Bleed Lines**
_____ **Solids Grid**
_____ **Filter Media**
_____ **Hydrocarbon Absorber III**
_____ **Jet Pump and Switch**
_____ **TurboHydrozone**
_____ **Polishing Filters**
_____ **Pressure Tank**
_____ **Options:**_____
_____ **Options:**_____

_____ **Sump Pump & Maintenance**
_____ **Electrical, Shutoffs, Etc.**
_____ **Centrifugal Separator**
_____ **Oil Accumulator**
_____ **Coalescing Tubes**
_____ **Hydrocarbon Absorber II**
_____ **Centrifugal Pump**
_____ **Chlorinator**
_____ **Fresh Water Make-up**
_____ **Air Compressor**
_____ **Pressure Gauges**
_____ **3 Way Control Valve**
_____ **Options:**_____
_____ **Options:**_____

CRITICAL FUNCTIONS AND PROCEDURE DISCUSSIONS

_____ **Basic Water Chemistry; pH, Alkalinity, TDS**
_____ **Algae/Bacteria Control; Chlorine, Hydrogen Peroxide**
Water Cycling, WC1
_____ **Water Testing; ETS Kit, pH Paper, TDS Meter**

_____ **Operator Safety; Clothing, Ventilation, Etc.**
_____ **Cleaning Agents; Enviro-Control, Ultra-Safe**
_____ **Water Management Recycled / Fresh Water**
_____ **Where to Get Help; Manuals, Distributor, *RGF***

CUSTOMER HANDOUTS AND SUPPORT MATERIAL

_____ **Operating Manuals**
_____ **Maintenance Video**
_____ **Water Test Kit**
_____ **Spare Parts List**

CUSTOMER EVALUATION OF START-UP TRAINING:

How Would You Rate Your Training? Good ____ Fair ____ Poor ____
General Comments_____
_____
_____
_____

***RGF* Tech. Rep. Signature**_____

Trainees Signature_____

ULTRASORB® System
Client Questionnaire

Company Name_____

Contact Person_____

Location_____

Phone (____)_____

***RGF* Dealer/Salesman**_____

Purchase Date (approx.)_____

Model_____ **Serial Number**_____

HOW WOULD YOU RATE THE FOLLOWING:

	GOOD	FAIR	POOR
General Operation	_____	_____	_____
Recycled Water Quality	_____	_____	_____
Quality of System	_____	_____	_____
Service & Support	_____	_____	_____
Warranty	_____	_____	_____
Installation / Training	_____	_____	_____
Safety	_____	_____	_____
***RGF* Dealer / Salesman**	_____	_____	_____
Value	_____	_____	_____

Would you purchase another *RGF* System? Yes ___ No _____

Comments_____

Completed By:_____ **Date**_____

Please return this form to:

RGF Environmental Group, Inc.
c/o Customer Service Dept.
3875 Fiscal Court
West Palm Beach, FL 33404
Fax: 516-848-9454

-

Glossary of Terms

Aeration Tower

Tall 2" dia. PVC pipe on the Series I Tank used to mix air into the waste stream to enhance oil separation and remove V.O.C.'s (volatile organic compounds).

Back Flush Cartridge Filter

A small cartridge filter used to remove any solids from the back flush water which may clog the MS^3 Membranes or Polishing Filters during back flushing.

Back Up H.I.P. Absorber Filter

An auxiliary H.I.P. Absorber that is activated when water usage rate exceeds product water rate produced by the MS^3 Membranes.

CFC System Pump

A continuous flow control centrifugal pump used to circulate the recycled water through the CO^3P System (Chemical Injection, Ozone Venturi and UV/O^3 Catalytic Chamber) and supplies the water to the cleaning equipment.

CO^3P system

(Catalytic Oxidation Process) System of low cost oxidant production is designed to provide a hydroxyl radical for contaminated water treatment. This system utilizes ozone, UV and hydrogen peroxide to create a hydroxyl radical ion for maximum oxidation and biodegradation.

Control Panel

Contains all the controls for the system: flow control valves, pressure gauges, indicator lights, and the hour meter.

Grass Catcher

A poly cart designed to remove large solids and grass from the waste stream before it enters the system.

H.I.P. Absorber

An absorption media filter designed to remove herbicides, insecticides and pesticides from the recycled water stream.

HCA-3 Absorber

Housed in a polyethylene vessel, is a hydrocarbon absorber used as a final measure of removing oils before the water is processed through the Polishing Filters or MS^3 Membranes. The Absorber consists of two highly absorbent medium, polyisocyanurate and fibrous polypropylene, to absorb low micron particles of oils, fuels, solvents, and hydrocarbons.

Main Drain Return Line

A recommended method of returning the drains of the system to the front end of the trench system. This line should be sized accordingly to accommodate the system drains.

Membrane Cleaning Tank

A cylindrical polyethylene tank which contains a cleaning solution to clean the MS^3 Membranes during the cleaning procedure.

MS^3 Membrane

A 500,000 molecular weight cut-off membrane that provides extra clean wash water by filtering process water to the sub-micron level.

Ozone and Chemical Venturi

A venturi used in the CO^3P system, which draws ozone produced by the UV/O^3 Catalytic Chamber and mixes it with the hydrogen peroxide before it enters the chamber.

Peristaltic Chemical Injection Pump

A peristaltic chemical pump that adds hydrogen peroxide or other chemicals to the recycled water to help control algae, bacteria, odor and pH. Hydrogen peroxide is an oxidant in the Catalytic Oxidation Process (CO^3P) that also increases ozone solubility.

Polishing Filter

Housed in a polypropylene vessel, used to pre-filter the water before it is processed through the rest of the system.

Gravity **Bag Filter**

A 1/2, 1, or 2 cubic yard solids collection bin used to filter large solids from the waste stream before entering the equipment skid. It utilizes a 50 micron stainless steel mesh bottom to remove large solids. A separate sump lift station is needed and is located under the bin to transfer the filtered water to the equipment skid.

Process Pump

A centrifugal pump located on the equipment rack of the Series II Equipment Skid, pumps the process water through the specific filters of the system.

Series II Electrical Junction Box

Contains all the electrical relays, timers and terminals for the system and connects them to the motors, lights, switch and UV chambers of the system.

Series II Equipment Skid

Contains all of the components of the system for processing the water.

Series III Storage Tank

A 500 (or 800) gallon cylindrical polyethylene tank used to store the recycled water for later use.

UV/O^3 Catalytic Chamber

The new UV/O^3 combination chamber produces over three times the ozone and approximately twice the ultraviolet radiation as our initial design. When these two components of the CO^3P process are combined into one unit, they become more effective, efficient and compact.

Vision 2000

The Vision 2000 line of Ultrasorb® systems was designed as modular units, to suit various treatment technologies. RGF has several individual components that may be integrated together to suit your environmental needs.